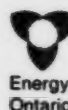

Monthly Solar Monitoring Reports



Ministry
of
Energy

Honourable
Philip Andrewes
Minister



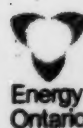
ONTARIO MINISTRY OF ENERGY

MONTHLY

SOLAR MONITORING REPORTS



Ministry of Energy
Honourable Philip Andrewes
Minister



ALPHABETICAL LIST OF PROJECTS

All Saints Anglican Church, King City.
Angus Laundromat, Angus.
Applewood Public School, St. Catharines.
Aquafarms, Feversham.
Aylmer Senior Citizens Apartments, Aylmer.
Barrie Community Centre, Barrie.
Barrie YMCA, Barrie.
Bethesda Home, Vineland.
Bronte Creek Provincial Park, Oakville.
Caswell Resort Hotel, Sundridge.
Cedar Park Church of Christ, Ajax.
Centralia College of Agriculture, Centralia.
Christie Brown and Company, Toronto.
Chutes Provincial Park, Massey.
Confederation College, Thunder Bay.
Coral Motel, Niagara Falls.
Courthouse and Registry Office, Newmarket.
Dryden Activity Complex, Dryden.
Erin Mills Lodge, Mississauga.
Glencannon Resorts, Cloyne.
Guelph Correctional Centre, Guelph.
Holiday Juice Company, Windsor.
Huron Park Swimming Pool, Mississauga.
Huron Steel, Windsor.
Huronian Driftwood Restaurant, Hawkstone.
Inglis Carpet Cleaners, Ottawa.
W.G. Johnson Swimming Pool, Cambridge.
Kakabeka Falls Provincial Park, Kakabeka Falls.
Long Point Provincial Park, Port Rowan.
Maedel Beverages, Essex.
Mapleview Lodge, Athens.
Mariner's Cove Restaurant, Ottawa.
McDonald's Restaurant, Hamilton.
McDonald's Restaurant, Napanee.
McDonald's Restaurant, Sault Ste. Marie.
McDonald's Restaurant, Toronto.
McDonald's Restaurant, Windsor.
Medallion Film Laboratories, Toronto.
Mew Lake, Algonquin Provincial Park.
Minute Car Wash, Ottawa.
Mohawk Hospital Services, Hamilton.
Ontario Correctional Institute, Brampton.
Porritts and Spencer, Hamilton.
Provincial Government Building, Sudbury.
Queen's University, Kingston.
Remi Lake Provincial Park, Kapuskasing.
Renaissance Hotel, Scarborough.
St. Andrew's Place, Sudbury.
St. James The Apostle Church, Sharon.
Sarsfield Senior Citizen Housing Project, Sarsfield.
Sibbald Point Provincial Park, Sutton.
York Condominiums, Islington.
York Electroplating, Thorold.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 102

REPORT DATE: 83/09/30

PAGE 1

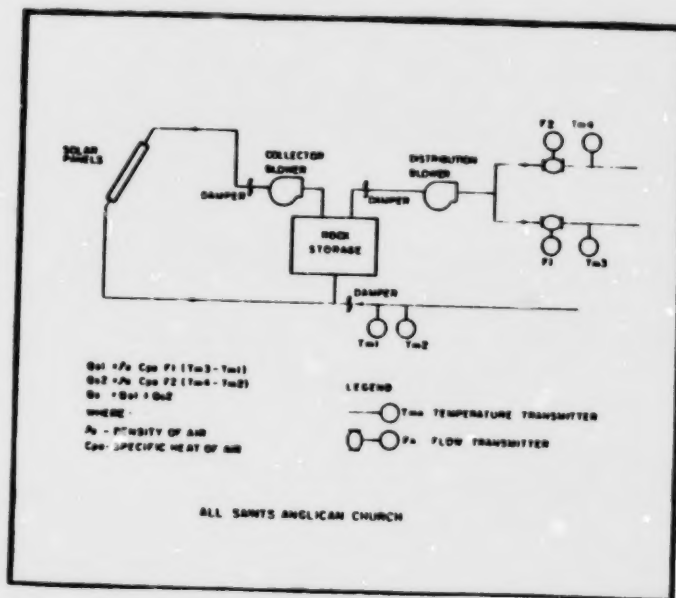
PROJECT NAME: ALL SAINTS ANGLICAN CHURCH
King City, Ontario.

CONTACT: G. Cruickshank
Rev. T. Elliot
TELEPHONE: (416) 833-5432

SERVICE: Space Heating

COMMISSIONING DATE: September 1982 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416) 965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: WATERSHED Energy Systems

Collector Fluid - Air

Number of Collectors - 140 Area - 259 square meters

SOLAR STORAGE: 132 cubic meters of crushed stone

AUXILIARY HEATERS: Oil-fired hot water boiler

MONITORING INSTRUMENTS: Ontario Research Foundation Single Channel Temperature

Sensors - 4 sets (5 sensors/set): Enercon flow transducer - 2

VARIABLES:

Q_s - total useful solar heat delivered to the load

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: All Saints Anglican Church
Location: King City, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82			6.55		-
NOV-82			2.91		Nov. & Dec. represent average from one reading
DEC-82			3.01		-
JAN-83	0.00	0.00	9.26		-
FEB-83			1.60		-
MAR-83			1.93		-
APR-83					
MAY-83			0.00		No data was available for May/83.
JUN-83			0.00		System shut down for the summer months.
JUL-83					
Totals			25.26		
Units: Gigajoules.					

Comments on System Performance:

- Auxiliary energy is not measured for this project.

Site number: 102

Page 3
Report Date: JUL/93

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: All Saints Anglican Church
Location: King City, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		18.1	
SEP-82	420		14.1	
OCT-82	279		8.5	
NOV-82	150		2.1	
DEC-82	130		-5.4	
JAN-83	96		-8.9	
FEB-83	252		-8.2	
MAR-83	403		-3.0	
APR-83	510		4.8	
MAY-83	620		11.3	
JUN-83	660		16.5	
JUL-83	682		19.1	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

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ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 104

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: ANGUS LAUNDROMAT
Angus, Ontario.

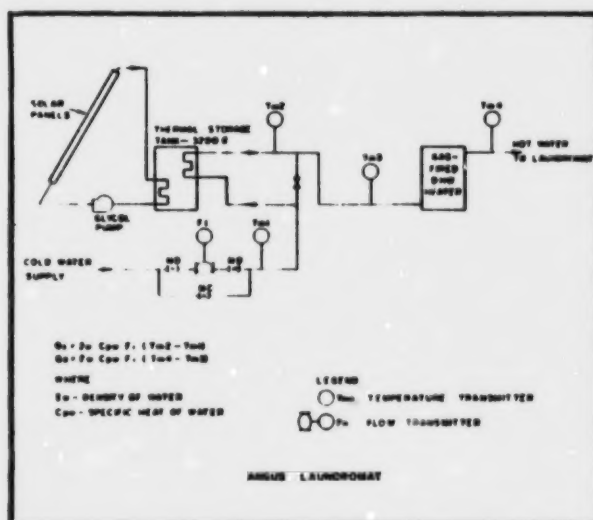
CONTACT: F. Bergie
TELEPHONE: (705) 424-5212

SERVICE: Hot water for laundry.

OPERATING TEMPERATURES: 5 degrees C inlet, 50 degrees C demand

COMMISSIONING DATE: July 1982 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416) 965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SUN-RAY
Collector Fluid - 50% propylene glycol and water
Number of Collectors - 24

Area - 41 square meters

SOLAR STORAGE: 3200 litres

HEAT EXCHANGER: Manufacturer:

Type: Single wall copper

Heat transfer area: 3.6 square meters

MONITORING INSTRUMENTS: Ontario Research Foundation Dual Channel Energy Meter
Temperature Sensors - Neptune 1 1/2" Trident flow meter.

VARIABLES:

Qs - total useful solar heat delivered to the load

Qa - total useful heat delivered to the same load by auxiliary heat source

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Angus Laundromat
Location: Angus, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			5.05 (6.84)	10.93 (9.14)	-
SEP-82			7.85 (5.69)	17.53 (19.69)	-
OCT-82			3.84 (4.59)	14.76 (14.01)	-
NOV-82			0.85 (1.89)	10.60 (9.56)	-
DEC-82			0.43 (1.25)	10.14 (9.32)	-
JAN-83			0.42 (0.00)	18.60 (0.00)	-
FEB-83			0.00 (0.00)	0.00 (0.00)	-
MAR-83			0.00 (0.00)	0.00 (0.00)	-
APR-83			4.30 (5.56)	10.06 (8.80)	-
MAY-83			0.00 (0.00)	0.00 (0.00)	-
JUN-83			2.95 (5.40)	4.72 (2.27)	System repaired and put into service June 17, 1983.
JUL-83			7.16 (6.87)	4.74 (5.03)	-

Totals 32.85 102.08

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- The leak which developed in November was repaired in April.

Site number: 104

Page 3
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Angus Laundromat
Location: Angus, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m2		Monthly Mean Ambient Temperature C	
	Historical Mean	Measured	Historical Mean	Measured
AUG-82	589		18.5	
SEP-82	420		14.5	
OCT-82	279		8.7	
NOV-82	150		2.5	
DEC-82	130		-5.1	
JAN-83	96		-8.4	
FEB-83	252		-8.1	
MAR-83	403		-2.7	
APR-83	510		5.4	
MAY-83	620		11.5	
JUN-83	660		16.9	
JUL-83	682		19.5	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 105

REPORT DATE: 83/09/30

PAGE 1

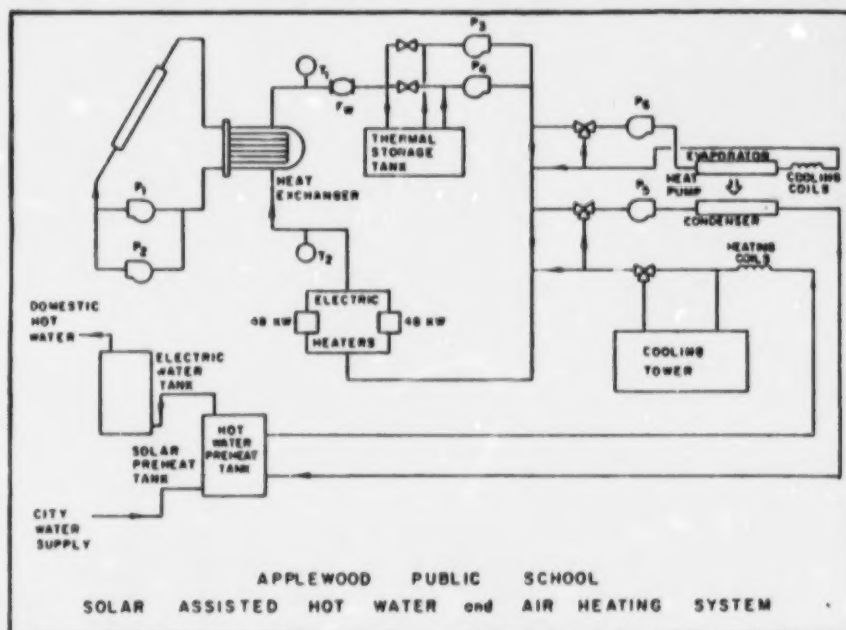
PROJECT DATE: APPLEWOOD PUBLIC SCHOOL
St. Catharines, Ontario.

CONTACT: Tim Neelin
Henry Ragetti
Doug Grayson
TELEPHONE: (416)685-1551

OPERATING TEMPERATURES:

COMMISSIONING DATE: September 1980

REPORTING PERIOD: August 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416) 965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: Solco Limited
Collector Fluid - 50% Propylene Glycol/Water; 129 Panels, collector area 230.21 square metres
Arrangement: 3 banks with 36 panels/1 bank with 21 panels

HEAT EXCHANGER: S.A. Armstrong heat exchanger Model Number W127.5-455

SOLAR STORAGE: 45460 litre with circulating pumps; 4" foam insulation and covered with fibreglass.

AUXILIARY HEATERS: 2 - 48 KW electric heaters

SERVICE: Domestic hot water and heat pump - Carrier Limited

MONITORING INSTRUMENTATION: Modified level A monitoring system measuring the following variables:
Qs - Useful energy delivered from the solar source.
Qa - Total electrical energy. (Includes all electrical equipment & lights) [GJ]
EXPECTED PERFORMANCE: 362 GJ/y from solar

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Applewood Public School
Location: St. Catharines, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			26.87	66.61	-
SEP-82			32.79	59.14	-
OCT-82			15.12	68.18	-
NOV-82			11.59	70.88	-
DEC-82	44.04	10.59	10.67	70.30	-
JAN-83	52.09	5.22	3.99	113.28	-
FEB-83	93.33	15.89	11.02	104.33	-
MAR-83	105.34	8.51	3.65	72.31	-
APR-83	86.42	20.25	14.05	59.42	-
MAY-83	116.93	35.08	23.32	57.26	-
JUN-83	135.81	5.16	4.99	44.40	-
JUL-83	295.71	11.23	10.86	96.67	-
Totals	929.66	111.92	173.92	882.78	

Units: Gigajoules.

Comments on System Performance:

- Q(a) includes all electric energy in the building
- A high level monitoring data report has been prepared by the Ontario Research Foundation for the National Research Council for the period January 1982 to January 1983 . This report does not include monitored data from the heat pump compressor.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Applewood Public School
Location: St. Catharines, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		21.0	
SEP-82	420		17.0	
OCT-82	279		10.9	
NOV-82	150		4.7	
DEC-82	130		-1.0	
JAN-83	96		-4.3	
FEB-83	252		-3.7	
MAR-83	403		0.7	
APR-83	510		7.2	
MAY-83	620		13.0	
JUN-83	660		19.0	
JUL-83	682		21.7	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 201

REPORT DATE: 83/09/30

PAGE 1

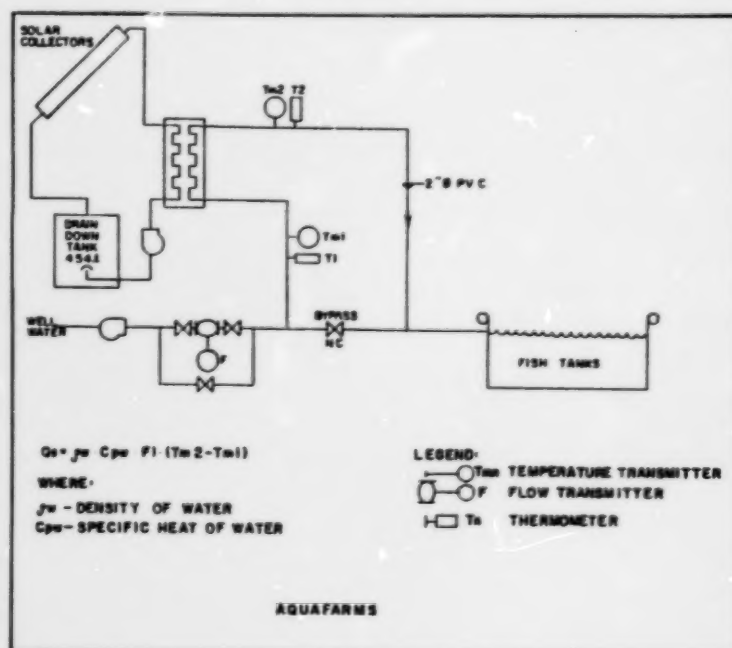
PROJECT NAME: AQUAFARMS

CONTACT: Alex Plomp
TELEPHONE: (519)922-2817

SERVICE: Preheat of water for fish tanks
OPERATING TEMPERATURES: 7 Degrees C Inlet; 15 Degrees C Demand

COMMISSIONING DATE: November 1, 1982 REPORTING PERIOD: Aug 82 - July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTECH
Collector Fluid - Water
Number of Collectors - 33 Area - 98 square meters
SOLAR STORAGE: None
AUXILIARY HEATERS: None
HEAT EXCHANGERS: Alfa Laval, 1.28 square meters
MONITORING INSTRUMENTS: 3.0" Kent Cold Water flow meter
Rho Sigma RS 805 FP energy meter
VARIABLES:
Qs - total useful solar heat delivered to the load

Site number: 201

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Aquafarms
Location: Feversham

Measured/(Predicted) Performance

Month	Q(l)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			0.00		
JUL-83			(0.00)	(0.00)	

Totals

Units: GigaJoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Site contact reports that monitoring equipment should be ready for calibration by mid October.

Site number: 201

Page 3
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Aquafarms
Location: Faversham

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m2		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		19.3	
SEP-82	420		15.4	
OCT-82	279		9.8	
NOV-82	150		3.3	
DEC-82	130		-3.7	
JAN-83	96		-6.6	
FEB-83	252		-6.6	
MAR-83	403		-1.8	
APR-83	510		5.6	
MAY-83	620		11.4	
JUN-83	660		17.1	
JUL-83	682		19.6	

Training and Recent Activity of Site Personnel:

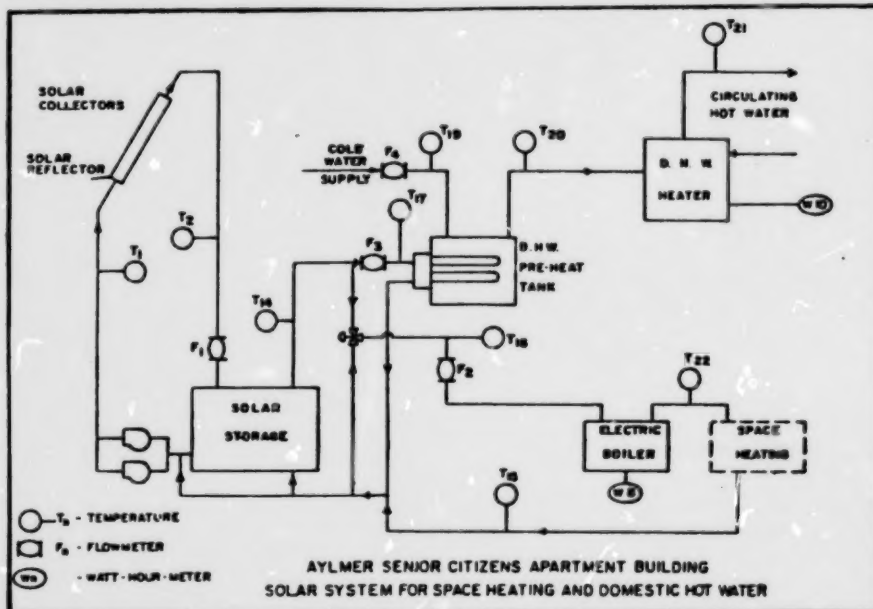
Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 106

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: AYLMER SENIOR CITIZENS APARTMENTS CONTACT: Ted Stevens
Aylmer, Ontario TELEPHONE: (519) 631-4580
OPERATING TEMPERATURES:
COMMISSIONING DATE: June 1980 REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416) 965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: TEMSPIC Limited
Collector Fluid - Water: 112 panels, collector area 218.6 square metres
Collector Azimuth 0 degrees; Collector slope 60 degrees to Horizontal.
Single glazing
SOLAR REFLECTORS:
DHW HEAT EXCHANGER: Manufacturer: Armstrong THW 860
Model # THW 860 Type: Immersion
Capacity: 0.909 cubic metres
10 US GPM 128 degrees F Supply
SOLAR STORAGE: 886,000 litres
AUXILIARY DHW Heaters: 13.5 kw electric; capacity of tank .55 cubic metres
SERVICE: Space Heating and Domestic Hot Water
MONITORING INSTRUMENTATION: 3 Siemens heat meters with Neptune hot water meters
EXPECTED PERFORMANCE: 272 GJ/y

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Aylmer Senior Citizen Apts
Location: Aylmer, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			0.00	52.21	-
SEP-82			0.14	56.74	-
OCT-82			12.46	52.70	-
NOV-82			13.21	62.21	-
DEC-82			7.09	68.26	-
JAN-83	47.50	2.52	4.82	85.54	-
FEB-83	73.02	0.00	0.04	100.94	-
MAR-83	92.45	33.12	0.00	101.66	-
APR-83	89.92	39.60	0.00	93.60	-
MAY-83	96.29	16.56	0.00	66.53	-
JUN-83	118.70	35.60	0.00	54.43	-
JUL-83	112.15	28.08	0.00	54.15	-
Totals	630.04	155.48	37.76	858.97	

Units: Gigajoules.

Comments on System Performance:

- This is an annual storage system to provide space heating and domestic hot water. Most of the useful solar energy will be delivered during the winter heating season.
- Solar pump controller is malfunctioning. Study under way by Ministry of Housing.
- Solar collector meter is malfunctioning.
- Solar monitoring instrumentation was installed by the National Research Council.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Aylmer Senior Citizen Apts
Location: Aylmer, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical Mean	Measured	Historical Mean	Measured
AUG-82	589		19.9	
SEP-82	420		16.3	
OCT-82	279		10.1	
NOV-82	150		3.8	
DEC-82	130		-2.5	
JAN-83	96		-5.5	
FEB-83	252		-4.9	
MAR-83	403		0.1	
APR-83	510		7.1	
MAY-83	620		12.9	
JUN-83	660		18.4	
JUL-83	682		20.7	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 226

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: BARRIE COMMUNITY CENTRE
Barrie, Ontario

CONTACT: Sid Armitage
TELEPHONE: (705) 726-4242

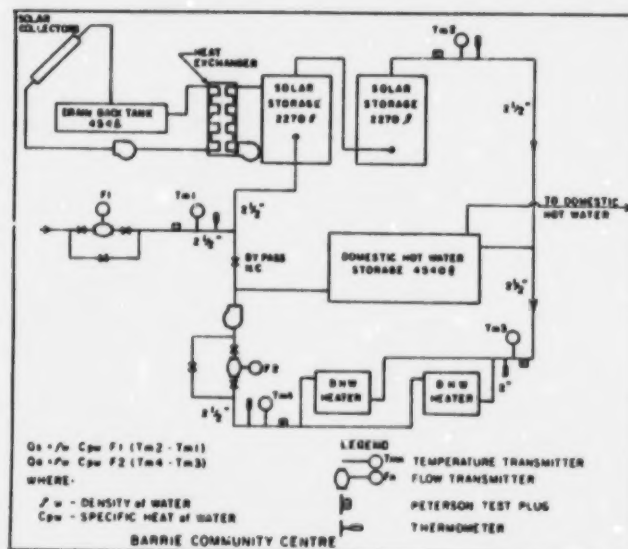
A Canada/Ontario Energy
Demonstration Project

SERVICE: Domestic Hot Water

OPERATING TEMPERATURES: 7.5 Degrees C Inlet; 60 Degrees C Demand

COMMISSIONING DATE: March 1, 1983

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTECH

Collector Fluid - Water (Drainback System)

Number of Collectors - 28

Area - 89.2 square meters

SOLAR STORAGE: 4540 litres

AUXILIARY HEATERS: 2 gas-fired DHW Heaters

HEAT EXCHANGERS: Armstrong 06160 A278, (Shell and Tube)

MONITORING INSTRUMENTS: Rho Sigma Dual Channel Energy Meter.

3 inch Kent cold water flow meter

2 inch Kent warm water flow meter

VARIABLES:

Qs - total useful solar heat delivered to the load

Qa - total useful heat delivered to the same load by auxiliary heat source

Site number: 226

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Barrie Community Centre
Location: Little Ave. , Barrie

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			5.54	5.10	Monitoring equipment commissioned June 17,83.
JUL-83			13.54	12.44	-
Totals			19.08	17.54	
Units: Gigajoules.					

Comments on System Performance:

- Instrumentation installed by monitoring contractor on June 20,1983.

Site number: 226

Page 3
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Barrie Community Centre
Location: Little Ave. , Barrie

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		18.1	
SEP-82	420		14.1	
OCT-82	279		8.5	
NOV-82	150		2.1	
DEC-82	130		-5.4	
JAN-83	96		-8.9	
FEB-83	252		-8.2	
MAR-83	403		-3.0	
APR-83	510		4.8	
MAY-83	620		11.3	
JUN-83	660		16.5	
JUL-83	682		19.1	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 202

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: BARRIE YMCA
Barrie, Ontario

CONTACT: Alan Hopper
TELEPHONE: (705) 726-6421

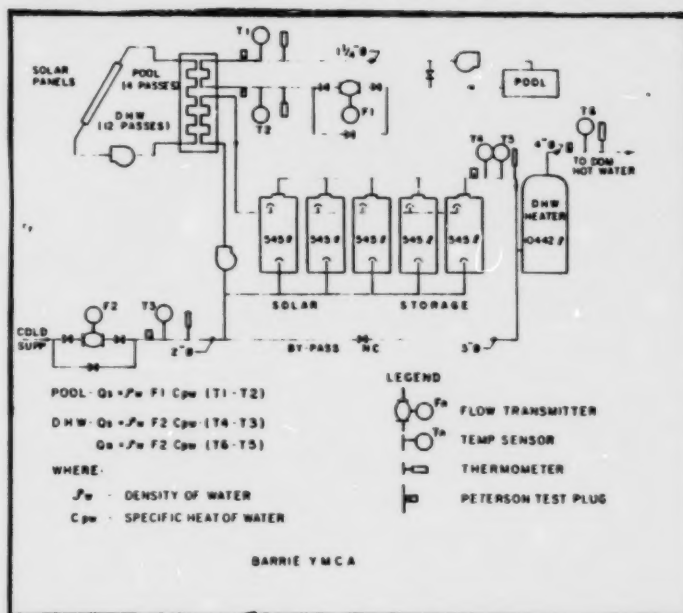
A Canada/Ontario Energy
Demonstration Project

SERVICE: Preheat of Domestic Hot Water
Swimming Pool Heating

OPERATING TEMPERATURES: 11 degrees C inlet; 62 degrees C demand

COMMISSIONING DATE: Dec 82

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416) 965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: ENERSOURCE
Collector Fluid - 50% propylene glycol, 50% water
Number of Collectors - 40 Area - 98 square meters

SOLAR STORAGE: DHW system - 2725 litres, pool heating - swimming pool

AUXILIARY HEATERS: Steam heated DHW heater, 8706.4 litres

HEAT EXCHANGERS: Noranda HX 886 350 LDDA - 12 passes for DHW preheat
- 4 passes for pool heating

MONITORING INSTRUMENTS: DHW System Pool Heating
Flow meter - Kent 2" TM230 - Kent 1 1/2" C-700
Energy meter - Rho Sigma Dual (RS815) - Rho Sigma Single (RS805)

VARIABLES:
DHW System
Qs - total useful solar energy delivered to the DHW system
Qa - total useful auxiliary energy delivered to the DHW system

Pool Heating
Qs - total useful solar energy delivered to pool

Site number: 200

Page 1
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Barrie YMCA
Location: Barrie ,Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			0.00 (0.00)	(0.00)	-
JUL-83			0.00 (0.00)	(0.00)	-

Totals

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Auxiliary Energy measured is for the DHW system only.
- Instrumentation installed by monitoring contractor on 1 June,1983.
- Monitoring equipment appears to be malfunctioning. Monitoring contractor to repair week of October 10 ,1983.

Site number: 200

Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Barrie YMCA
Location: Barrie, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		18.1	
SEP-82	420		14.1	
OCT-82	279		8.5	
NOV-82	150		2.1	
DEC-82	130		-5.4	
JAN-83	96		-8.9	
FEB-83	252		-8.2	
MAR-83	403		-3.0	
APR-83	510		4.8	
MAY-83	620		11.3	
JUN-83	660		16.5	
JUL-83	682		19.1	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
During Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 204

REPORT DATE: 83/09/30

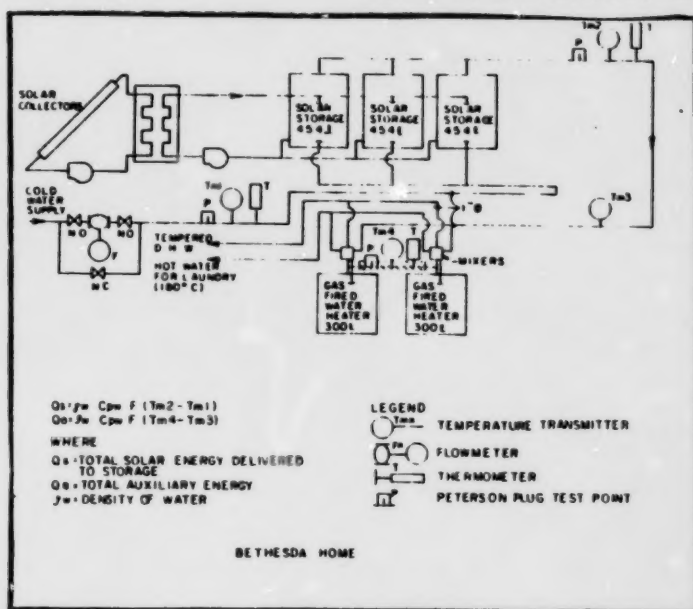
PAGE 1

PROJECT NAME: BETHESDA HOME
Vineland, Ontario

CONTACT: Pete Derkeson
TELEPHONE: (416)685-6573

A Canada/Ontario Energy
Demonstration Project

SERVICE: Preheat for Domestic Hot Water used by laundry and residents
OPERATING TEMPERATURES: 6 degrees C inlet; 75 degrees C demand
COMMISSIONING DATE: Dec 82 REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: ENERSOURCE
Collector Fluid - 50% propylene glycol, 50% water
Number of Collectors - 14 Area - 59.8 square meters
SOLAR STORAGE: 1636.6 litres
AUXILIARY HEATERS: 2 gas fired DHW heaters, 607.5 litres total,
(610,000 BTU/hr)
HEAT EXCHANGERS: Noranda HX 886 350 LDDA
MONITORING INSTRUMENTS: Flow meter - Kent 1", C-700
Energy meter - Rho Sigma Dual, (RS815) channel for
solar energy delivered; channel for auxiliary energy
from DHW heater

VARIABLES:

Qs - total useful solar energy delivered to the load
Qa - total useful auxiliary energy delivered to the same load by
the auxiliary heat source

Site number: 204

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Bethesda Home
Location: Vineland, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			0.41 (9.09)	19.97 (11.29)	-
JUL-83			0.42 (9.77)	20.59 (11.24)	-
Totals			0.83	40.56	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Instrumentation installed by monitoring contractor on 20 May, 1983.
- Site contact reports a possible backflow problem. Monitoring contractor will investigate.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Bethesda Home
Location: Vineland, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		21.0	
SEP-82	420		17.0	
OCT-82	279		10.9	
NOV-82	150		4.7	
DEC-82	130		-1.0	
JAN-83	96		-4.3	
FEB-83	252		-3.7	
MAR-83	403		0.7	
APR-83	510		7.2	
MAY-83	620		13.0	
JUN-83	660		19.0	
JUL-83	682		21.7	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

Site number: 1084

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Bronte Creek ,Concession Bldg.
Location: Oakville

Measured/(Predicted) Performance

Month	Q(1)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83					
JUL-83			0.60 (1.07)	0.47 (0.00)	Monitoring equipment commissioned on July 6, 1983.
Totals			0.60	0.47	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- System was calibrated on a site visit
in August.

Site number: 108A

Page 3
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Bronte Creek ,Concession Bldg.
Location: Oakville

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface J/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		19.7	
SEP-82	420		16.0	
OCT-82	279		9.9	
NOV-82	150		4.3	
DEC-82	130		-1.9	
JAN-83	96		-5.0	
FEB-83	252		-4.4	
MAR-83	403		0.1	
APR-83	510		6.3	
MAY-83	620		11.5	
JUN-83	660		17.2	
JUL-83	682		20.1	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 206

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: Caswell Resort Hotel

CONTACT: Bill Clark
TELEPHONE: (705)384-5371

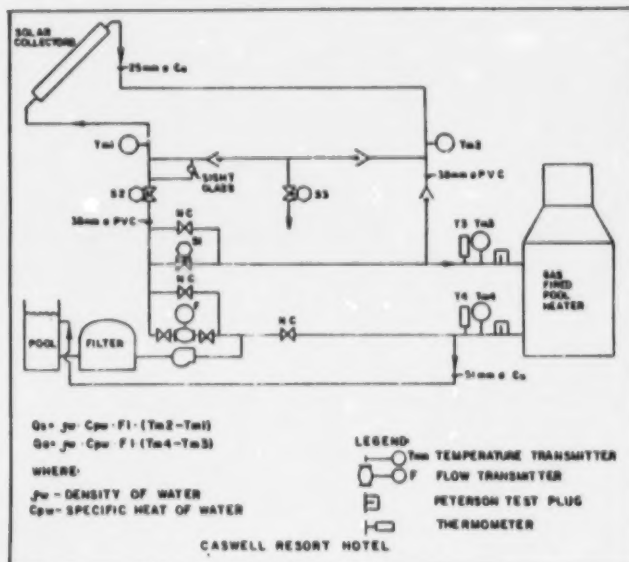
A Canada/Ontario Energy
Demonstration Project

SERVICE: Pool Heating

OPERATING TEMPERATURES: 20 Degrees C Inlet, 28 Degrees C Demand

COMMISSIONING DATE: December, 1982

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTHERM

Collector Fluid - Water

Number of Collectors - 15

Area - 46 square meters

SOLAR STORAGE: The pool

AUXILIARY HEATERS: Ray Pack gas fired pool heater, 140,000 BTU/hr.

HEAT EXCHANGERS: None

MONITORING INSTRUMENTS: Flow Meter: 1 1/2" Kent Tm200

Energy Meter: Dual Channel Rho Sigma RS 815-FP

VARIABLES:

Qs - total useful solar heat delivered to the load

Qa - total useful heat delivered to the same load by auxiliary heat source

Site number: 206

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Caswell Resort Hotel
Location: Sundridge

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
-------	------	------	------	------	---------

AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83					
JUL-83					

			11.18		
			(9.92)		

					The readings for July
				(1.26)	were averaged.

Totals

11.18

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Monitoring equipment commissioned July 21, 1983.

Site number: 206

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

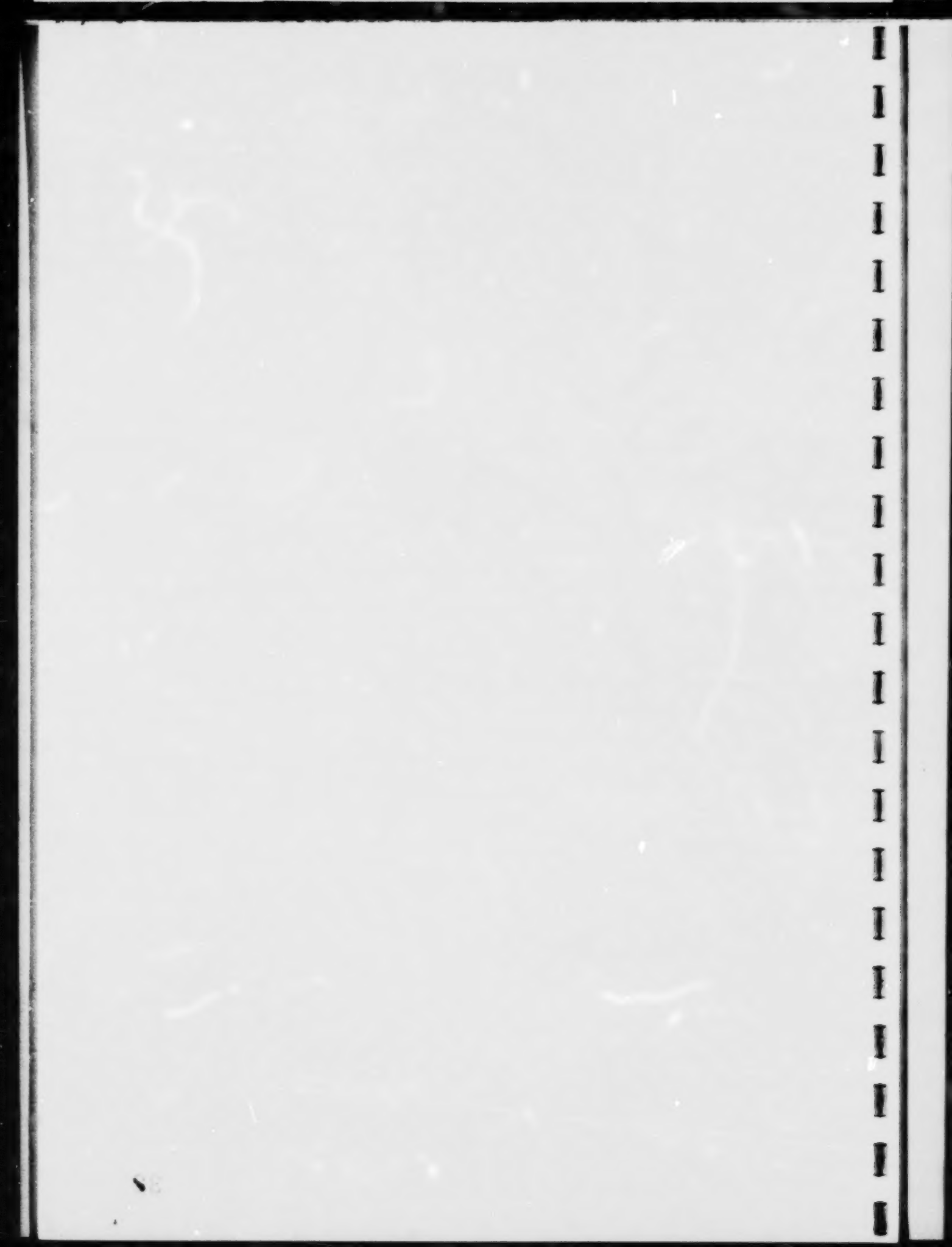
Site: Caswell Resort Hotel
Location: Sundridge

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		18.2	
SEP-82	420		13.3	
OCT-82	279		7.4	
NOV-82	150		0.5	
DEC-82	130		-8.5	
JAN-83	96		-12.2	
FEB-83	252		-10.4	
MAR-83	403		-4.1	
APR-83	510		4.2	
MAY-83	620		11.6	
JUN-83	660		16.8	
JUL-83	682		19.4	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 112

REPORT DATE: 83/09/30

PAGE 1

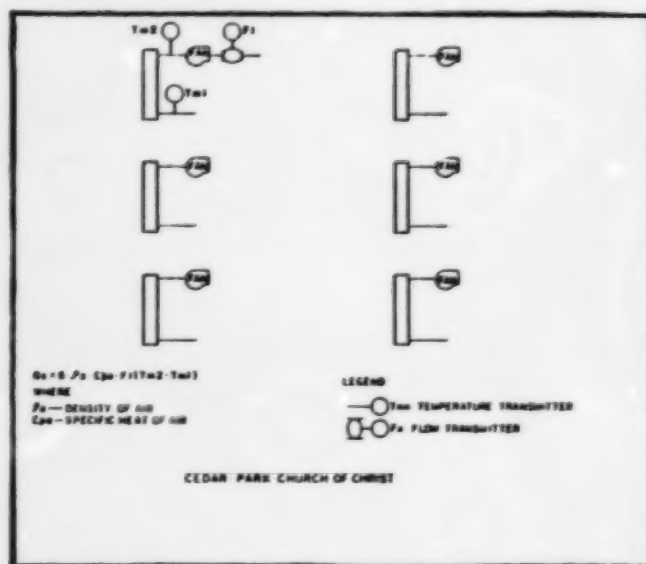
PROJECT NAME: CEDAR PARK CHURCH OF CHRIST
Ajax, Ontario.

CONTACT: T. Coddling
TELEPHONE: (416)683-2477

SERVICE: Space Heating.

COMMISSIONING DATE: September 1982 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTECH
Collector Fluid - Air Number of Collectors - 30

Area - 57 square meters

AUXILIARY HEATERS: Oil-fired forced air furnace Capacity 390,000 BTU/hr

MONITORING INSTRUMENTS: Ontario Research Foundation Air Energy Meter with
temperature sensors and an Enercon flow transmitter.

VARIABLES:

Q_s - total useful solar heat delivered to the load

Site number: 112

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Cedar Park Church of Christ
Location: Ajax, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82			2.73		-
DEC-82			2.73		-
JAN-83	0.00	0.00	2.73		-
FEB-83			5.34		-
MAR-83			4.73		-
APR-83			1.04		-
MAY-83			1.26		System shut down end of May, for the summer.
JUN-83			0.00		System shut down for the summer months.
JUL-83			0.00		System was shut down for summer months.
Totals			20.56		
Units: Gigajoules.					

Comments on System Performance:

- Reading for November and December are averages.
- Auxiliary energy is not measured for this project.

Site number: 112

Page 3
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Cedar Park Church of Christ
Location: Ajax, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		18.8	
SEP-82	420		14.8	
OCT-82	279		8.4	
NOV-82	150		2.8	
DEC-82	130		-4.3	
JAN-83	96		-7.4	
FEB-83	252		-7.1	
MAR-83	403		-1.7	
APR-83	510		5.4	
MAY-83	620		11.6	
JUN-83	660		16.8	
JUL-83	682		19.4	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 113

REPORT DATE: 83/09/30

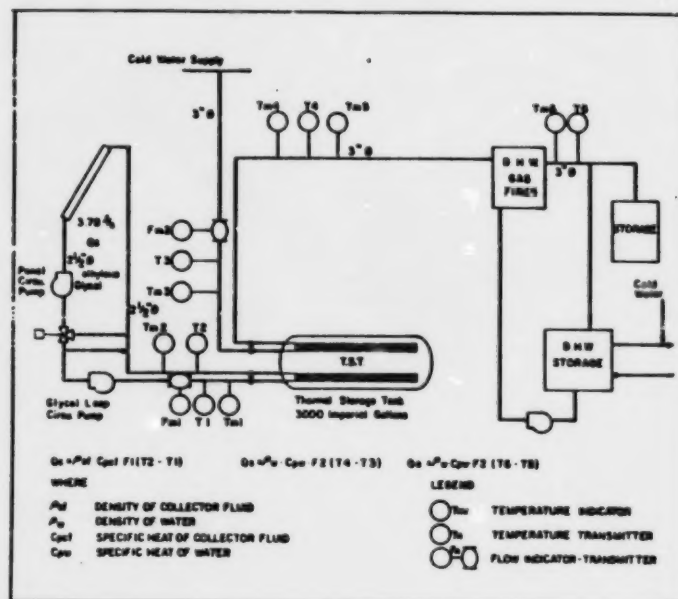
PAGE 1.

PROJECT NAME: CENTRALIA COLLEGE OF AGRICULTURE
Centralia, Ontario.

CONTACT: D. Hughson
TELEPHONE: (519)228-6691

OPERATING TEMPERATURES:

COMMISSIONING DATE: September 1980 REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416) 965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: NORTEC Solar Industries, "High-Y Model
Collector Fluid - 50% Ethylene Glycol/Water; 61 panels, collector
area 143 square metres

Arrangement: 3 rows with 14, 23 and 24 panels,

HEAT EXCHANGER: Glycol/Water Copper U Tube Bundle Immersion type
Water - Copper U Tube Bundle Immersion type

SOLAR STORAGE: 12,728 litres

AUXILIARY HEATERS:

SERVICE: Domestic hot water

MONITORING INSTRUMENTATION: Modified level A monitoring system
measuring the following variables:

Q_c - total solar energy collected

Q_s - total useful solar energy delivered to domestic hot water system

Q_a - total auxiliary energy to domestic hot water system

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Centralia College
Location: Centralia, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			3.80 (7.45)	3.74 (0.09)	-
SEP-82			1.21 (1.42)	0.21 (0.00)	-
OCT-82			2.52 (3.27)	1.15 (0.00)	An open bypass valve has reduced solar flow - corrected 15 Dec 82.
NOV-82			2.13 (3.29)	2.54 (1.38)	-
DEC-82		0.68	1.25 (2.84)	2.75 (1.16)	Connections between panels are defective and are being replaced.
JAN-83	0.00	0.00	0.77 (3.84)	7.46 (4.39)	-
FEB-83	0.00	0.00	2.88 (6.08)	11.19 (7.99)	-
MAR-83			4.91 (0.00)	4.66 (0.00)	Repairs complete.
APR-83		1.51	2.88 (7.12)	6.81 (2.57)	-
MAY-83		0.09	5.80 (5.63)	0.13 (0.30)	-
JUN-83		0.09	0.33 (0.34)	0.01 (0.00)	System was shut down for two weeks in June awaiting the replacement of a faulty solenoid valve.
JUL-83		0.43	4.22 (4.36)	0.14 (0.00)	-
Totals		2.80	32.70	40.79	

Units: Gigajoules. Predicted performance is based on the "F Chart" model, using real load data, and historical average weather data.

Comments on System Performance:

- This solar hot water system is an Ontario Ministry of Government Services solar energy project.
- An error in piping will seriously inhibit solar collection in this installation. The error should be corrected.

Site number: 113

Page 3
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Centralia College
Location: Centralia, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		19.9	
SEP-82	420		16.0	
OCT-82	279		10.2	
NOV-82	150		3.5	
DEC-82	130		-6.0	
JAN-83	96		-6.1	
FEB-83	252		-5.8	
MAR-83	403		-0.9	
APR-83	510		6.6	
MAY-83	620		12.8	
JUN-83	660		18.3	
JUL-83	682		20.6	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 114

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: CHRISTIE BROWN and COMPANY

CONTACT: Byron Penney
TELEPHONE: (416) 252-4411

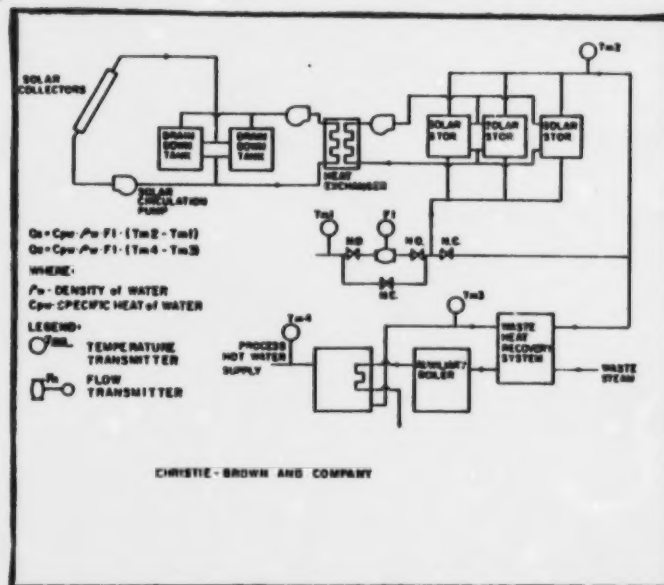
SERVICE: Preheating Process water

OPERATING TEMPERATURES: 5 degrees C inlet, degrees C demand

COMMISSIONING DATE: October 1982

REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy Contact
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETRO SUN

Collector Fluid - Water (drain down system)

Number of Collectors - 160 in 4 parallel rows Area - 360 square meters

SOLAR STORAGE: 15000 litres

AUXILIARY HEATERS: Gas fired boilers (1230 KW)

HEAT EXCHANGER: Alfa Laval P22VL

MONITORING INSTRUMENTS: Flow meter - 3" Neptune trident

Energy meter - Dual channel ORF energy meter

VARIABLES:

Qs - total useful solar heat delivered to the load

Qa - total useful heat delivered to the same load by auxiliary heat source

Site number: 114

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Christie Brown and Company
Location: Toronto

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			104.50	416.70	-
			(109.99)	(411.31)	
JUL-83			191.90	448.30	-
			(119.09)	(521.12)	
Totals			296.50	865.00	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Defective instrumentation installed by previous monitoring contractor was repaired and recalibrated by present monitoring contractor on April 13, 1983. Monitoring data are being collected.
- Monitoring equipment commissioned on June 13, 1983.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Christie Brown and Company
Location: Toronto

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		21.2	
SEP-82	420		17.1	
OCT-82	279		11.0	
NOV-82	150		4.9	
DEC-82	130		-1.6	
JAN-83	96		-4.6	
FEB-83	252		-3.9	
MAR-83	403		0.7	
APR-83	510		7.6	
MAY-83	620		13.6	
JUN-83	660		19.1	
JUL-83	682		22.0	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY MONITORING REPORT
SITE NUMBER 115

REPORT DATE: 83/09/30

PAGE 1.

PROJECT NAME: CHUTES PROVINCIAL PARK
Massey, Ontario

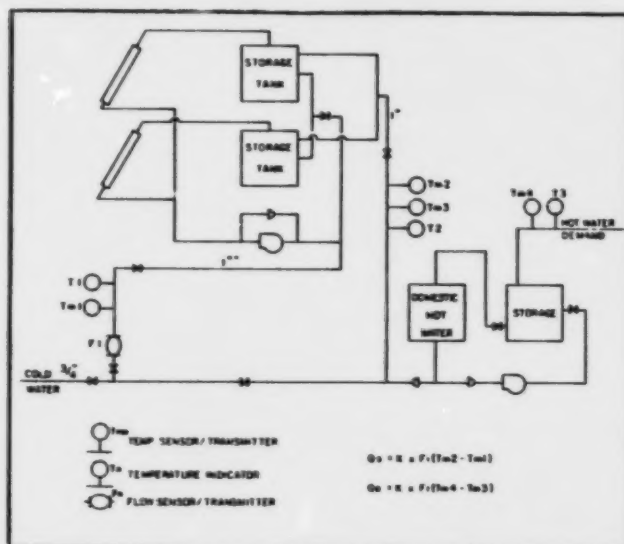
CONTACT: M. Charette
TELEPHONE: (705) 865-2021

OPERATING TEMPERATURES:

COMMISSIONING DATE: May 1981

REPORTING PERIOD: Jan to June 83

Ministry of
Energy contact:
J. Herberman
(416) 965-1367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETRO-SUN Limited
Collector Fluid - Water
Number of Panels - 8
Collector Area - 14.3 square metres

SOLAR STORAGE: 545 litres
AUXILIARY HEATERS: 360,000 BTU/hour
SERVICE: Domestic hot water

MONITORING INSTRUMENTATION: Level A monitoring provided by ORF energy meters measuring the following variables:

Qs - total useful solar energy delivered to load
Qa - total auxiliary energy

Site number: 115

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Chutes Provincial Park
Location: Massey, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			3.76 (3.59)	11.32 (11.49)	-
SEP-82			0.55 (1.20)	0.72 (0.07)	-
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83			1.22 (2.00)	1.46 (0.68)	Park opened May20/83.
JUN-83			3.88 (3.13)	5.46 (6.21)	-
JUL-83			5.01 (4.00)	12.55 (13.56)	-
Totals			14.42	31.51	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

Site number: 115

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Chutes Provincial Park
Location: Massey, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	496		17.2	
SEP-82	360		12.5	
OCT-82	217		7.0	
NOV-82	120		-0.2	
DEC-82	109		-7.7	
JAN-83	96		-11.7	
FEB-83	252		-10.5	
MAR-83	403		-5.1	
APR-83	510		2.9	
MAY-83	605		10.1	
JUN-83	690		15.8	
JUL-83	651		18.4	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 116

REPORT DATE: 83/09/30

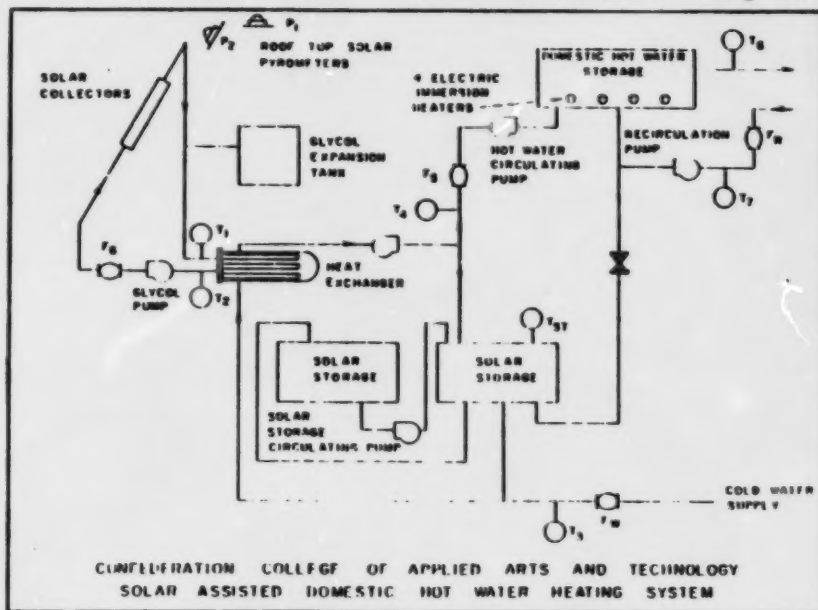
PAGE 1

PROJECT NAME: CONFEDERATION COLLEGE
Thunder Bay, Ontario.

CONTACT: Ian Clark
Wm. Fauconnier
TELEPHONE: (807) 475-6110

OPERATING TEMPERATURES:

COMMISSIONING DATE: March 1980 REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416) 965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: Amherst Renewable Energies Limited
Collector fluid 60% Propylene Glycol/Water; 36 panels, collector area of 99.61 square metres Arrangement: 2 parallel banks of 18 panels

HEAT EXCHANGER: Manufacturer: Bell & Gosset Model WU65-43
Glycol in tubes, Solar Storage Water in Shell

SIZE: Heat transfer area 2.04 square metres

SOLAR STORAGE: 2 - 3218 litre with circulating pump

AUXILIARY HEATERS: 4 heaters rated at 12 KW each

SERVICE: Circulating Domestic Hot Water

MONITORING INSTRUMENTATION: Level B monitoring system supplied by Digital Engineering. On-line data acquisition system reporting following variables.

Qi - Total Incident Solar Energy Qc - Total Solar Energy Collected
P2 x Area [GJ] Kc x FG x (T1 - T2) [GJ]

Qa - Total Electrical Energy Qs - Solar Energy delivered equals
Heater Load x Heater 'on-time' [GJ] Total Energy less Electrical
Energy used (Qt - Qa)

Qt - Total Energy delivered to Tst - Solar Storage Tank Temperature
recirculating hot water system [degrees C]

[KX x FW x (T6 - T3) + KR x FR x (T6 - T7)] [GJ]

Tamb - Ambient Temperature (at collectors) [degrees C]

S - Glycol Pump Motor 'on-time' [h]

EXPECTED PERFORMANCE: See page 2.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Confederation College
Location: Thunder Bay, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			1.47 (7.27)	5.80 (0.00)	-
SEP-82			0.40 (9.77)	13.94 (4.58)	Cold water temperature sensor failure. Recalibration required
OCT-82			0.00 (7.32)	9.63 (2.31)	-
NOV-82			0.00 (4.19)	17.33 (13.14)	-
DEC-82	0.00	0.00	0.00 (0.00)	0.00 (0.00)	No data due to monitoring system failure. Problem has been resolved.
JAN-83	38.25	4.86	0.00 (4.94)	17.90 (12.96)	-
FEB-83	41.24	4.65	0.00 (7.65)	18.58 (10.92)	-
MAR-83	32.05	7.98	0.00 (9.57)	15.41 (5.84)	-
APR-83	47.40	10.83	0.00 (0.00)	19.25 (0.00)	-
MAY-83	58.34	8.09	2.68 (11.32)	16.70 (8.06)	-
JUN-83	58.34	8.09	2.68 (11.45)	16.70 (7.93)	-
JUL-83	53.60	4.95	1.89 (11.80)	12.19 (2.28)	-

Totals 329.23 49.46 9.12 163.43

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Solar energy is calculated from the difference between total energy delivered and input electrical energy so recirculation and storage losses are taken from the solar energy total.
- The building manager is using the solar storage tank to store electrically heated water. The high temperature of this electrically heated water seriously impairs the efficiency of the solar collectors.
- The building is lightly used during the summer.
- On May 6, 1983 the building operator returned one of the storage tanks to it's proper use.

Site number: 116

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Confederation College
Location: Thunder Bay, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	496		16.4	
SEP-82	360		11.1	
OCT-82	217		5.7	
NOV-82	120		-2.6	
DEC-82	109		-11.1	
JAN-83	96		-15.4	
FEB-83	252		-13.0	
MAR-83	403		-6.3	
APR-83	510		2.5	
MAY-83	605		8.8	
JUN-83	690		14.0	
JUL-83	651		17.6	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 117**

REPORT DATE: 83/09/30

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PROJECT NAME: CORAL MOTEL

Lundy's Lane, Niagara Falls, Ont.

CONTACT: J. Orsini

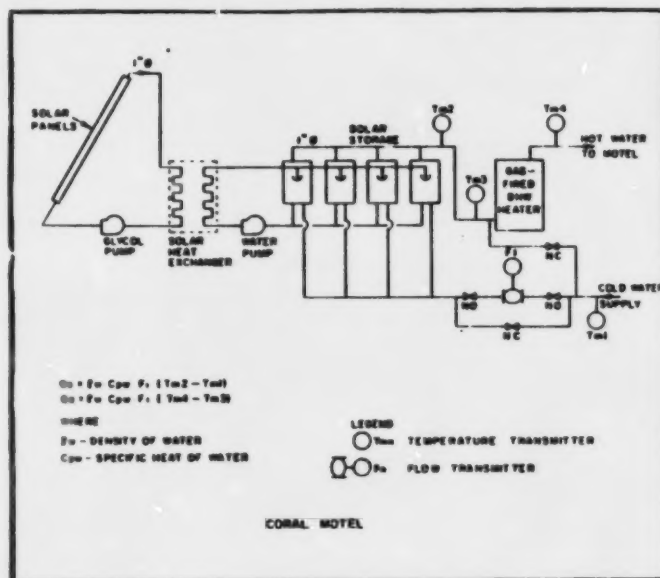
TELEPHONE: (416)354-9922

SERVICE: Domestic hot water.

OPERATING TEMPERATURES: 5 degrees C inlet, 50 degrees C demand

COMMISSIONING DATE: October 1981 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: ENERSOURCE

Collector Fluid - 60% propylene glycol and water

Number of Collectors - 24

Area - 47.8 square meters

SOLAR STORAGE: 1091 litres

AUXILIARY HEATERS: Gas-fired hot water heater 714 BTU/hr

HEAT EXCHANGER: Manufacturer: Noranda Metalwork HX-886-350-LDO-A

Heat transfer area: 1.5 square meters

VARIABLES:

Q_s - total useful solar heat delivered to the load

Q_a - total useful heat delivered to the same load by auxiliary heat source

Site number: 117

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Coral Motel
Location: Niagara Falls, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82			1.66 (1.28)	4.65 (5.03)	-
DEC-82			1.26 (0.64)	4.07 (4.69)	-
JAN-83			0.91 (0.00)	3.66 (0.00)	-
FEB-83			0.82 (2.34)	3.30 (1.78)	-
MAR-83			2.66 (4.43)	5.23 (3.46)	-
APR-83			4.04 (6.16)	9.47 (7.35)	-
MAY-83			6.17 (7.85)	17.33 (15.65)	-
JUN-83			8.00 (8.42)	24.90 (24.48)	-
JUL-83			9.46 (9.90)	33.04 (32.60)	-

Totals 34.98 105.65

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Voltage regulator replaced on energy board by
monitoring contractor 16 Dec. 1982.

Site number: 117

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Coral Motel
Location: Niagara Falls, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		21.4	
SEP-82	420		17.3	
OCT-82	279		11.1	
NOV-82	150		4.6	
DEC-82	130		-1.2	
JAN-83	96		-4.6	
FEB-83	252		-4.0	
MAR-83	403		0.6	
APR-83	510		7.2	
MAY-83	620		13.5	
JUN-83	660		19.3	
JUL-83	682		22.0	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 118

REPORT DATE: 83/09/30

PAGE 1.

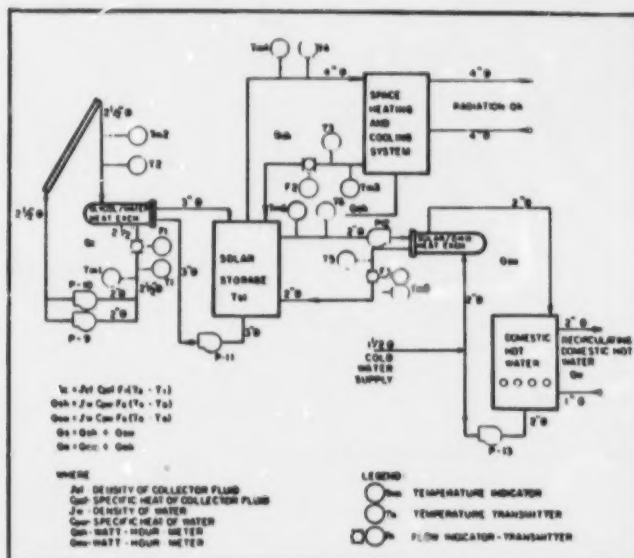
PROJECT NAME: COURTHOUSE AND REGISTRY OFFICE,
Newmarket, Ontario.

CONTACT: K. Howarth
TELEPHONE: (416) 898-1209

OPERATING TEMPERATURES:

COMMISSIONING DATE: April 1980 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416) 965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLCO Limited (SOLATHERM Ltd.)
Collector Fluid - Glycol/Water; 104 panels, collector area 186 square metres
Arrangement: 4 arrays with 17 panels, 1 array with 14 panels and 2 arrays with 11 panels
HEAT EXCHANGER: Glycol/Water Armstrong W89.25S015
Water/Water Armstrong W65-43
SOLAR STORAGE: 368,000 litres
AUXILIARY HEATERS: 25 KW immersion heater
300 KW electric boiler space heating
SERVICE: Space heating and domestic hot water
MONITORING INSTRUMENTATION: Modified level A monitoring system measuring the following variables:

Qc - total solar energy collected
Qs - total useful solar energy delivered to load
Qa - total auxiliary energy (building kilowatt-hour meter)

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Courthouse and Registry Office
Location: Newmarket, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			9.91	819.72	-
SEP-82			5.99	531.36	-
OCT-82			0.53	511.92	-
NOV-82			0.57	660.94	-
DEC-82		2.63	2.96	758.16	-
JAN-83		5.95	5.07	855.36	-
FEB-83		21.53	2.24	774.36	-
MAR-83		21.53	9.09	852.75	-
APR-83		14.68	11.55	628.06	-
MAY-83		21.42	5.23	643.29	-
JUN-83		28.41	2.20	590.50	-
JUL-83		21.71	0.30	511.69	-
Totals		137.86	55.64	8138.11	

Units: Gigajoules.

Comments on System Performance:

- This solar energy system is an Ontario Ministry of Government Services solar energy project.
- Q(a) includes heat pump compressor.
- Demand for the solar space heating in this building is zero.
- P-13 has been shut down and valved off. Solar heat is delivered to service water via a single pass through a low effectiveness solar/DHW heat exchanger.
- DHW demand is low.

Site number: 118

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Courthouse and Registry Office
Location: Newmarket, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		19.2	
SEP-82	420		15.1	
OCT-82	279		9.0	
NOV-82	150		2.4	
DEC-82	130		-4.7	
JAN-83	96		-8.1	
FEB-83	252		-7.6	
MAR-83	403		-2.4	
APR-83	510		5.5	
MAY-83	620		11.9	
JUN-83	660		17.2	
JUL-83	682		20.0	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY MONITORING REPORT
SITE NUMBER 122

REPORT DATE: 83/09/30

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PROJECT NAME: DRYDEN ACTIVITY COMPLEX

CONTACT: M. Fisher
TELEPHONE: (807)223-2367

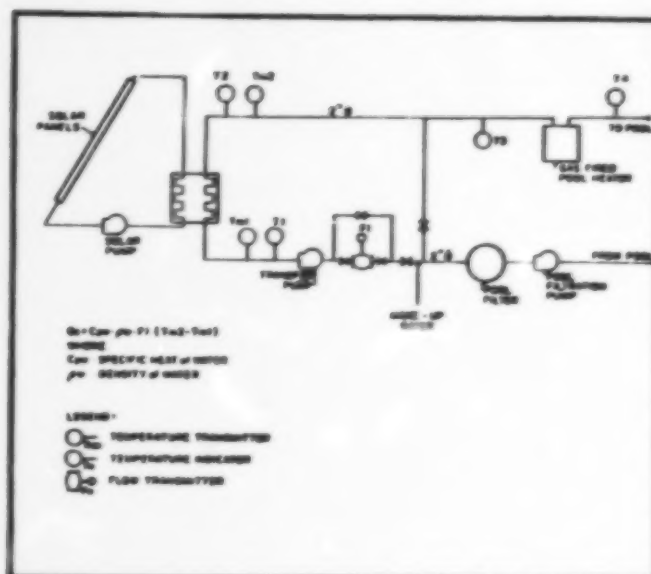
A Canada/Ontario Energy
Demonstration Project

SERVICE: Swimming Pool Heating

OPERATING TEMPERATURES: 27 Degrees C inlet, 29 degrees C demand

COMMISSIONING DATE: April 1983

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETRO-SUN

Collector Fluid - 58% propylene glycol, 42% water

Number of Collectors - 66

Area - 200 square meters

SOLAR STORAGE: Swimming pool

AUXILIARY HEATERS: Gas-fired pool heater (700,000 BTU/hour)

HEAT EXCHANGER: Alfa Laval P22VL

MONITORING INSTRUMENTS: Flow meter - 3" Neptune Green Seal

Energy meter - Ontario Research Foundation Single
Channel for solar energy delivered

Elapsed time meter - monitoring usage of auxiliary
gas heater

VARIABLES:

Qs - total useful solar heat delivered to the load

Qa - total useful heat delivered to the same load by auxiliary heat source

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Dryden Activity Complex
Location: Dryden

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83			40.90 (0.00)	4.63 (0.00)	-
JUN-83			49.90 (41.97)	0.00 (7.93)	Site was visited on June 20 and the calibration was verified.
JUL-83			51.70 (44.62)	0.00 (7.08)	-
Totals			142.50	4.63	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Instrumentation was installed under the supervision of the monitoring contractor and calibrated on May 5, 1983.
- Monitoring data are being gathered.
- Monitoring equipment installed May 5/83.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Dryden Activity Complex
Location: Dryden

Weather Data for the Site (for previous 12 months):

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	455		17.0	
SEP-82	360		11.2	
OCT-82	217		5.3	
NOV-82	120		-4.7	
DEC-82	130		-14.4	
JAN-83	96		-19.0	
FEB-83	252		-15.3	
MAR-83	403		-7.5	
APR-83	510		2.4	
MAY-83	605		10.1	
JUN-83	690		15.7	
JUL-83	651		18.7	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 210**

REPORT DATE: 83/09/30

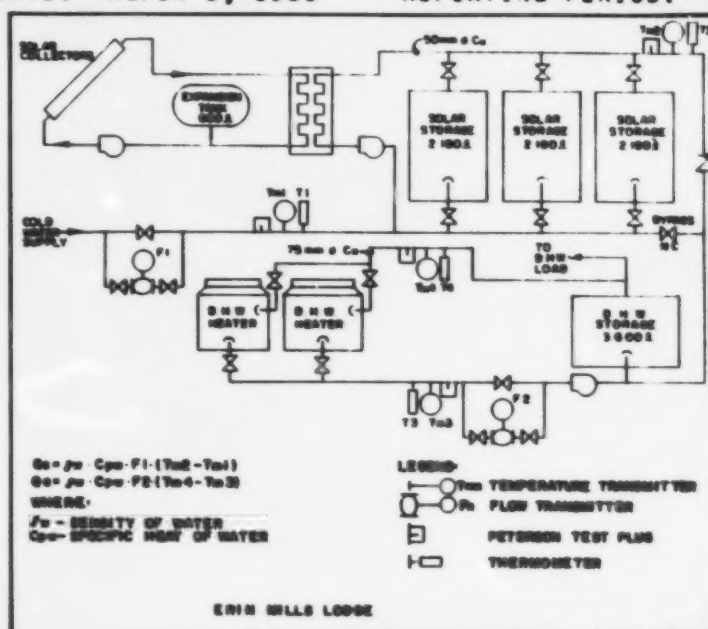
PAGE 1

PROJECT NAME: ERIN MILLS LODGE
Mississauga, Ontario

CONTACT: David Scully
Sunny Fidd
TELEPHONE: (416) 623-6700

SERVICE: Domestic Hot Water
OPERATING TEMPERATURES: 14 Degrees C Inlet; 65 Degrees C Demand

COMMISSIONING DATE: March 1, 1983 REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETROSUN
Collector Fluid - 50% propylene glycol, 50% water
Number of Collectors - 40 Area - 150 square meters

SOLAR STORAGE: 6540 litres

AUXILIARY HEATERS: Teledyne Laars, (2), gas fired, 1,466,000 Btu/hr

HEAT EXCHANGERS: Alpha laval, P22-VL

MONITORING INSTRUMENTS: Flow meters - Solar, Kent C-700, 1.5"
- Auxiliary, Kent TM-230, 2.0"
Energy meter - Rho Sigma RS 815 FP, (Dual), with
channel for solar energy delivered, channel for
auxiliary energy delivered

VARIABLES:

Qs - total useful solar heat delivered to the load
Qa - total useful heat delivered to the same load by auxiliary heat
source

Site number: 210

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Report Date: JUL/93

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Erin Mills Lodge
Location: Mississauga

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83					
JUL-83			4.69 (25.63)	28.09 (7.15)	monitoring equipment commissioned on July 18, 1983.
Totals			4.69	28.09	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Erin Mills Lodge
Location: Mississauga

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		19.7	
SEP-82	420		16.0	
OCT-82	279		9.9	
NOV-82	150		4.3	
DEC-82	130		-1.9	
JAN-83	96		-5.0	
FEB-83	252		-4.4	
MAR-83	403		0.1	
APR-83	510		6.3	
MAY-83	620		11.5	
JUN-83	660		17.2	
JUL-83	682		20.1	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 124A

REPORT DATE: 83/09/30

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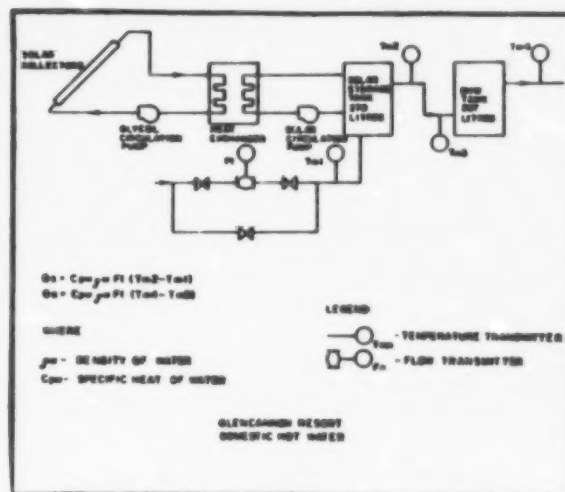
PROJECT NAME: GLENCANNON RESORTS
Cloyne, Ontario

CONTACT: Ted Cannon
TELEPHONE: (613) 336-2425

SERVICE: Domestic Hot Water
COMMISSIONING DATE: September 1982

REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLATHERM
Collector Fluid - 50% propylene, glycol/water
Number of Collectors - 6 Area - 13.8 square meters
ARRANGEMENT: Single row
SOLAR STORAGE: 270 litres
AUXILIARY HEATERS: 60 gallon GSW model number 5E 820-123
HEAT EXCHANGER: Alpha Laval CB 25 - Heat transfer area 0.4 square meters
MONITORING INSTRUMENTS: Solar and Auxiliary - Ontario Research Foundation
Dual Channel Energy Meter with 3/4" Neptune Flowmeter
VARIABLES:
Qs - total useful solar heat delivered to the load
Qa - total auxiliary energy

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Glencannon Resorts(DHW)
Location: Cloyne

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82			0.01	0.21	-
OCT-82			0.42	1.11	-
NOV-82			1.11	1.55	-
DEC-82			1.13	1.60	-
JAN-83			0.05	2.04	-
FEB-83			0.04	1.84	-
MAR-83					
APR-83			0.00	2.41	-
MAY-83			0.03	2.35	-
JUN-83			0.02	2.28	New flowmeter pulseheads have been ordered.
JUL-83			0.03	2.33	-
Totals			2.84	17.72	

Units: Gigajoules.

Comments on System Performance:

- Energy meter circuit board and flow meter transmitter inspected 5 July 1983 by monitoring contractor. Voltage regulator installed. Solar system was bypassed and was very low on glycol. After refilling and closing the bypass valve the system began collecting solar energy.
- Demand for DHW is low at this location.
- Solar system required 181 litres of glycol/water mixture to be added for the system to become operational.

Site number: 124A

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ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Glencannon Resorts(DHW)
Location: Cloyne

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		17.5	
SEP-82	420		13.0	
OCT-82	279		6.7	
NOV-82	150		0.5	
DEC-82	130		-7.7	
JAN-83	96		-11.1	
FEB-83	252		-9.9	
MAR-83	403		-3.8	
APR-83	510		4.5	
MAY-83	620		11.1	
JUN-83	660		16.2	
JUL-83	682		18.8	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 1248

REPORT DATE: 83/09/30

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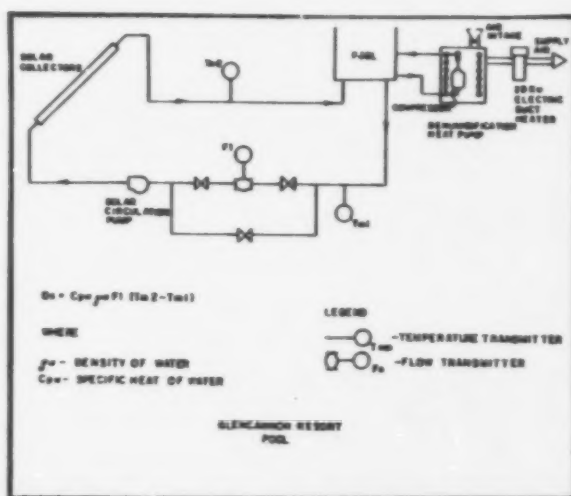
PROJECT NAME: GLENCANNON RESORTS
Cloyne, Ontario

CONTACT: Ted Cannon
TELEPHONE: (613) 336-2425

SERVICE: Pool Heat

COMMISSIONING DATE: September 1982 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLATHERM

Collector Fluid - Water (Drain down)

Number of Collectors - 20 (2 rows)

Area - 46.2 square meters

SOLAR STORAGE: None

AUXILIARY HEATERS: 20 KW Duct Heater, 25 KW Dehumidifying Heat Pumps

MONITORING INSTRUMENTS: Solar - Ontario Research Foundation Single Channel

Energy Meter with 1 1/2" Neptune Flowmeter

Auxiliary - a) Duct heater - KWH meter 230V, single phase

b) Heat pump compressor - KWH meter 230V, single phase

VARIABLES:

Qs - total useful solar heat delivered to the load

Qs - total auxiliary energy

Site number: 1248

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ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Glencannon Resorts(pool)
Location: Cloyne

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82			0.33	2.34	-
OCT-82			0.67	16.58	-
NOV-82			0.00	0.00	-
DEC-82			0.00	0.00	-
JAN-83			0.18	31.14	-
FEB-83			0.16	28.13	-
MAR-83					
APR-83			0.00	9.32	-
MAY-83			0.31	8.37	-
JUN-83			0.31	8.11	New flowmeter pulseheads have been ordered.
JUL-83			0.31	8.37	-
Totals			2.27	112.36	

Units: Gigajoules.

Comments on System Performance:

- Freezing problems have impaired the performance of these solar collectors.
- Flow meter transmitters are defective and must be replaced. Readings will be invalid until modifications are made.
- A possible source of freezing problems is the icing up of air vents and vacuum breakers.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Glencannon Resorts(pool)
Location: Clonyne

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		17.5	
SEP-82	420		13.0	
OCT-82	279		6.7	
NOV-82	150		0.5	
DEC-82	130		-7.7	
JAN-83	96		-11.1	
FEB-83	252		-9.9	
MAR-83	403		-3.8	
APR-83	510		4.5	
MAY-83	620		11.1	
JUN-83	660		16.2	
JUL-83	682		18.8	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 124C**

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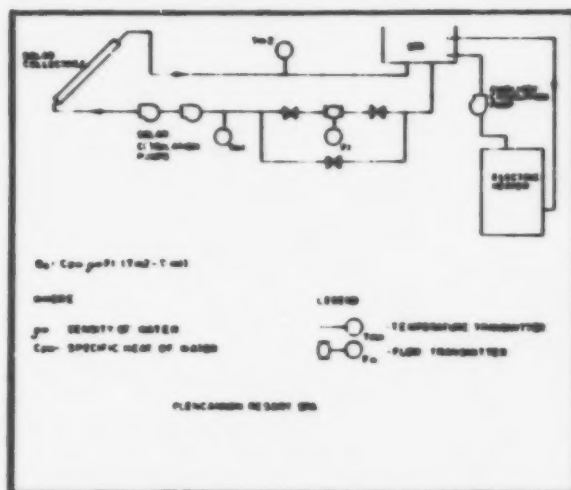
PROJECT NAME: GLENCANNON RESORTS (SPA)
Cloyne, Ontario

CONTACT: Ted Cannon
TELEPHONE: (613) 336-2425

SERVICE: Spa Heat

COMMISSIONING DATE: September 1982 **REPORTING PERIOD:** Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLATHERM
Collector Fluid - Water (Drain down system)
Number of Collectors - 6 Area - 13.6 square meters

SOLAR STORAGE: None

AUXILIARY HEATERS: 7.5 KW Electric Heater

MONITORING INSTRUMENTS: Solar - Ontario Research Foundation Single Channel
Energy Meter with 3/4" Neptune Flowmeter
Auxiliary - KMH meter 230V, single phase

VARIABLES:
Qs - total useful solar heat delivered to the load
Qa - total auxiliary energy

Site number: 124C

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ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Glencannon Resorts(spa)
Location: Cloyne

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82			0.00	1.02	-
OCT-82			0.00	2.19	-
NOV-82			0.11	3.33	-
DEC-82			0.12	3.35	-
JAN-83			0.00	2.85	-
FEB-83			0.00	2.58	-
MAR-83					
APR-83			0.00	1.95	-
MAY-83			0.00	2.06	-
JUN-83			0.00	1.19	New flowmeter pulseheads have been ordered.
JUL-83			0.00	1.19	-
Totals			0.23	21.71	

Units: GigaJoules.

Comments on System Performance:

- Flow meter transmitters are defective and must be replaced. Readings will be invalid until modifications are made.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Glencannon Resorts(spa)
Location: Clonyne

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		17.5	
SEP-82	420		13.0	
OCT-82	279		6.7	
NOV-82	150		0.5	
DEC-82	130		-7.7	
JAN-83	96		-11.1	
FEB-83	252		-9.9	
MAR-83	403		-3.8	
APR-83	510		4.5	
MAY-83	620		11.1	
JUN-83	660		16.2	
JUL-83	682		18.8	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



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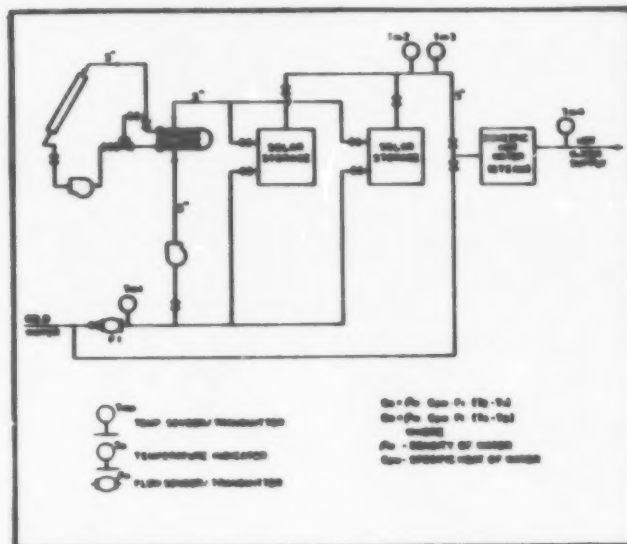
PROJECT NAME: GUELPH CORRECTIONAL CENTRE
Guelph, Ontario.

CONTACT: B. Leader
TELEPHONE: (519)822-0020

OPERATING TEMPERATURES:

COMMISSIONING DATE: June 1992 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416) 965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETROSUN Limited
Collector Fluid - 50% Propylene Glycol/Water; 80 panels, collector area 238 square metres

Arrangement: 8 rows, 10 panels in each

HEAT EXCHANGER: Alfa-Laval P22-V1 Flat plate

SOLAR STORAGE: 2 - 4,540 litre storage tanks

AUXILIARY HEATERS: Steam heated storage tank

SERVICE: Domestic hot water

MONITORING INSTRUMENTATION: Modified level A monitoring system measuring the following variables:

Q_s - total useful solar energy delivered to domestic hot water system
 Q_a - total auxiliary energy to domestic hot water system

**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT**

Site: Guelph Correctional Centre
Location: Guelph, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			31.57 (39.80)	128.93 (120.70)	-
SEP-82			51.08 (32.06)	133.54 (151.76)	-
OCT-82			46.59 (26.85)	248.47 (268.21)	-
NOV-82			25.11 (6.62)	211.33 (229.82)	-
DEC-82			8.62 (1.26)	81.31 (88.67)	Construction in mechanical room is affecting monitoring
JAN-83			10.54 (0.00)	59.07 (0.00)	-
FEB-83			5.79 (0.00)	15.11 (0.00)	-
MAR-83			8.96 (17.82)	18.69 (9.72)	-
APR-83			5.55 (18.36)	21.23 (9.42)	-
MAY-83			19.55 (36.34)	557.51 (549.72)	-
JUN-83			102.40 (40.19)	412.90 (475.11)	Site contact has reported major problems with leaks. One panel was replaced and eleven were repaired.
JUL-83			22.72 (30.16)	20.49 (13.05)	-

Totals

338.38 1918.57

Units: Gigajoules. Predicted performance is based on the "F Chart" model, using real load data, and historical average weather data.

Comments on System Performance:

- Solar system is operational ,but monitoring equipment is not due to a flowmeter failure.

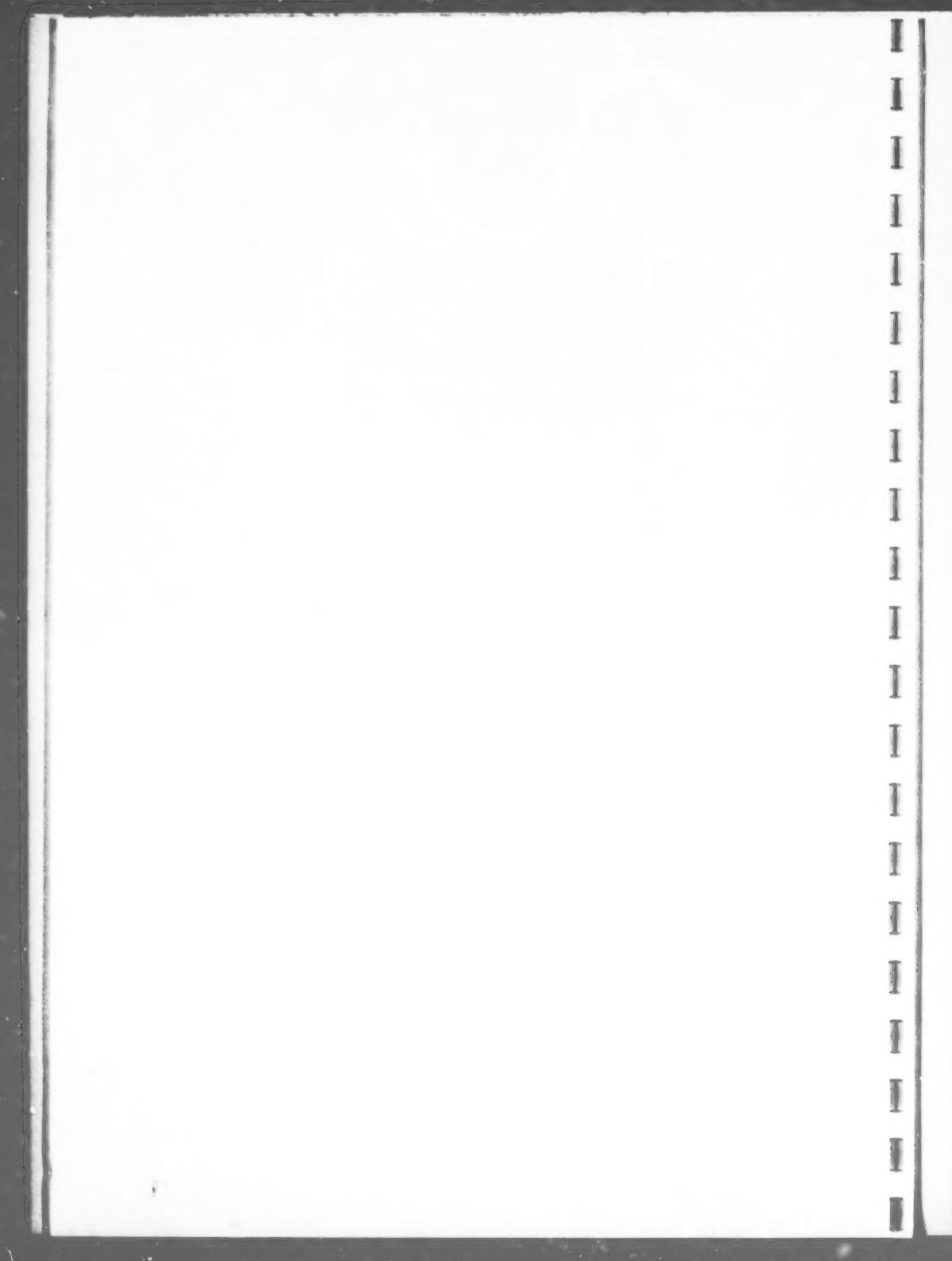
ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Guelph Correctional Centre
Location: Guelph, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		18.8	
SEP-82	420		15.0	
OCT-82	279		9.2	
NOV-82	150		2.5	
DEC-82	130		-4.1	
JAN-83	96		-7.2	
FEB-83	252		-6.5	
MAR-83	403		-1.9	
APR-83	510		5.8	
MAY-83	620		11.7	
JUN-83	660		17.4	
JUL-83	682		19.7	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
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PROJECT NAME: HOLIDAY JUICE LTD.

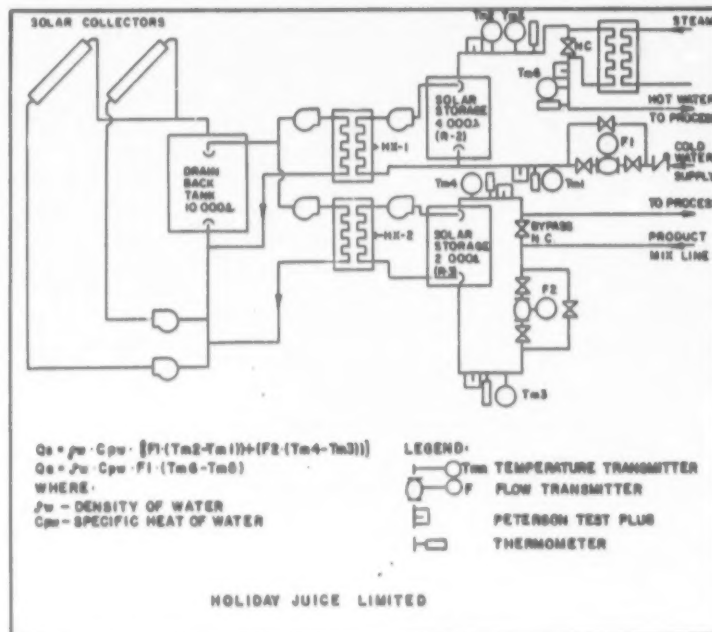
CONTACT: Albert Demers
Dan Kotwicki
TELEPHONE: (519) 252-4471

SERVICE:

OPERATING TEMPERATURES: 10 Degrees C Inlet; 65 Degrees C Demand

COMMISSIONING DATE: October 1, 1983

REPORTING PERIOD: Aug 82 - July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETROSUN
Collector Fluid - Water
Number of Collectors - 108 Area - 324 square meters
SOLAR STORAGE: 16,000 litres
AUXILIARY HEATERS: Steam, via heat exchanger
HEAT EXCHANGERS: two Alpha Laval P-22 VL

MONITORING INSTRUMENTS: Flow meters - Kent TM2000, 2"
- Kent TM2000, 3"

Energy meters - Rho Sigma RS 815 FP Dual Channel
- Rho Sigma RS 805 FP Single Channel

VARIABLES:

Qs - total useful solar heat delivered to the load
Qa - total useful heat delivered to the same load by auxiliary heat source

Site number: 213

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ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Holiday Juice
Location: Windsor

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83					
JUL-83			2.08 (7.69)	5.61 - (0.00)	
Totals			2.08	5.61	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Monitoring equipment commissioned
and calibrated July 22, 1983.
- System is used for a bottle washer and
rinser.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Holiday Juice
Location: Windsor

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		21.3	
SEP-82	420		17.4	
OCT-82	279		11.1	
NOV-82	150		4.4	
DEC-82	130		-1.9	
JAN-83	96		-4.9	
FEB-83	252		-3.8	
MAR-83	403		1.2	
APR-83	510		8.1	
MAY-83	620		14.2	
JUN-83	660		19.7	
JUL-83	682		22.2	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 126

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PROJECT NAME: HURON PARK SWIMMING POOL

CONTACT: E. Van Buskirk
TELEPHONE: (416) 279-8200

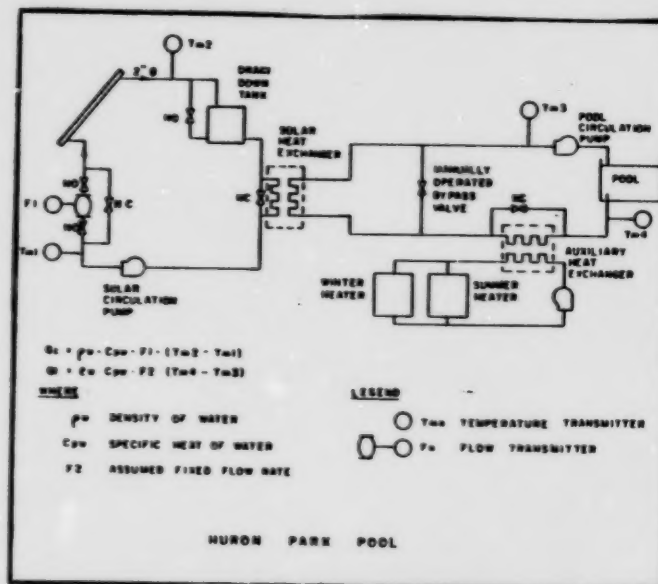
SERVICE: Swimming pool heat

OPERATING TEMPERATURES: 27 degrees C inlet, 29 degrees C demand

COMMISSIONING DATE: August 1982

REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETRO SUN
Collector Fluid - Water (drain down system)
Number of Collectors - 60 in 5 arrays Area - 190 square meters

SOLAR STORAGE: swimming pool

AUXILIARY HEATERS: 2 gas boilers 10,500 MBTU/HR (winter use)
1,466 MBTU/HR (summer use)

HEAT EXCHANGER: Solar - Alfa Laval P22-VL

MONITORING INSTRUMENTS: Solar: flow meter - 3" Neptune Crest Full Flow
ORF single channel energy meter
Auxiliary: ORF constant pulse rate flow meter
simulator
ORF single channel energy meter

VARIABLES:

Qs - total useful solar heat delivered to the load
Qa - total useful heat delivered to the same load by auxiliary heat source

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Huron Park Swimming Pool
Location: Mississauga

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83			0.00		-
			(0.00)	(0.00)	
APR-83			1.75	34.10	-
			(0.00)	(0.00)	
MAY-83			4.13	80.60	-
			(0.00)	(0.00)	
JUN-83			16.80	57.10	-
			(47.00)	(26.90)	
JUL-83			10.81	0.00	-
			(10.81)	(0.00)	

Totals 33.49 171.80

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Solar flow meter transmitting microswitch was corroded but was repaired by monitoring contractor on April 15, 1983. Monitoring data are being gathered.
- Solar collection is impaired by rigid insistence on exact pool temperature, 24 hours per day, and hysteresis in control of gas-fired heaters.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Huron Park Swimming Pool
Location: Mississauga

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		21.2	
SEP-82	420		17.1	
OCT-82	279		11.0	
NOV-82	150		4.9	
DEC-82	130		-1.6	
JAN-83	96		-4.6	
FEB-83	252		-3.9	
MAR-83	403		0.7	
APR-83	510		7.6	
MAY-83	620		13.6	
JUN-83	660		19.1	
JUL-83	682		22.0	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

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PROJECT NAME: HURON STEEL
3710 Peter St., Windsor, Ont.

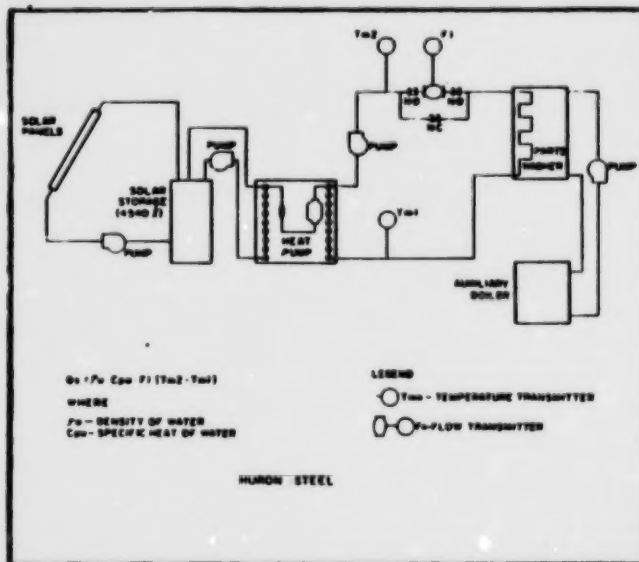
CONTACT: B. Ashton
TELEPHONE: (519)254-2841

SERVICE: Process water for parts washer.
OPERATING TEMPERATURES:

COMMISSIONING DATE: August 1982

REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SUN-RAY

Number of Collectors - 20

SOLAR STORAGE: 4540 litres

AUXILIARY HEATERS: Oil-fired boiler

HEAT EXCHANGER: Manufacturer: Fedders Carnot II

Heat pump Model Number SOCF040-700

VARIABLES:

Qs - total useful solar heat delivered to the load

Qa - total electrical energy delivered to the heat pump

Water drain-down system
Area - 38 square meters

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Huron Steel
Location: Windsor, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82	0.00	0.00	1.00 (0.00)	0.96 (0.00)	-
SEP-82	0.00	0.00	0.00 (0.00)	1.30 (0.00)	-
OCT-82	0.00	0.00	0.00 (0.00)	0.54 (0.00)	-
NOV-82					
DEC-82					
JAN-83	0.00	0.00	1.50 (0.00)	0.42 (0.00)	-
FEB-83			1.20 (0.00)	0.59 (0.00)	-
MAR-83			3.40 (0.00)	1.27 (0.00)	-
APR-83			3.66 (0.00)	1.39 (0.00)	-
MAY-83			4.44 (0.00)	1.68 (0.00)	-
JUN-83			6.37 (7.83)	2.37 (0.91)	Monitoring equipment was calibrated July 21, 1983.
JUL-83			5.79 (7.82)	2.21 (0.18)	-

Totals 27.36 12.72
 Units: Gigajoules. Predicted performance is based on the "F Chart" model,
 using real load data, and historical average weather data.

Comments on System Performance:

- The solar heated water is used only 3 times per week to maintain the temperature of a process bath, which is pre-heated before the process by the oil-fired boiler.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Huron Steel
Location: Windsor, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		21.3	
SEP-82	420		17.4	
OCT-82	279		11.1	
NOV-82	150		4.4	
DEC-82	130		-1.9	
JAN-83	96		-4.9	
FEB-83	252		-3.8	
MAR-83	403		1.2	
APR-83	510		8.1	
MAY-83	620		14.2	
JUN-83	660		19.7	
JUL-83	682		22.2	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 214**

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PROJECT NAME: HURONIA DRIFTWOOD RESTAURANT
Hawkstone, Ontario

CONTACT: Urs Buechin
TELEPHONE: (705)487-3311

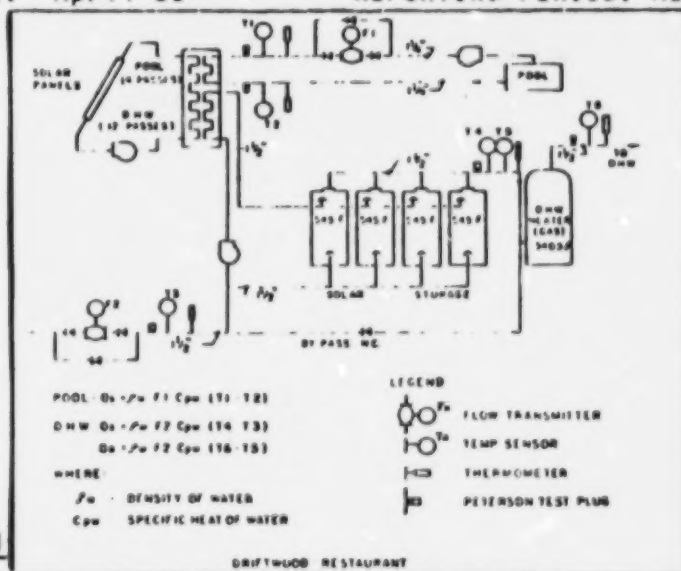
A Canada/Ontario Energy
Demonstration Project

SERVICE: Preheat of Domestic Hot Water
Swimming Pool Heating

OPERATING TEMPERATURES: 15 degrees C inlet; 56 degrees C demand

COMMISSIONING DATE: April 83

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION

SOLAR COLLECTORS: Manufacturer: ENERSOURCE
Collector Fluid - 50% propylene glycol, 50% water
Number of Collectors - 20 Area - 85.5 square meters

SOLAR STORAGE:

AUXILIARY HEATERS: Gas DHW heater, 340.5 litres

HEAT EXCHANGERS: Noranda. HX 886 350 LDDA - 12 passes for DHW preheat
- 4 passes for pool heating

MONITORING INSTRUMENTS: DHW System

Flow meters - Kent 2" TM230

Pool Heating

- Kent 1" C-700

Energy meters - Rho Sigma Dual (RS815) - Rho Sigma Single (RS805)

VARIABLES:

DHW System

Q_s - total useful solar energy delivered to DHW system

Q_a - total useful auxiliary energy delivered to DHW system

Pool Heating

Q_s - total useful solar energy delivered to pool

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Huronia Driftwood Restaurant
Location: Hawkstone, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			2.92 (7.81)	6.03 (1.14)	-
JUL-83			3.36 (8.95)	6.95 (1.36)	-

Totals 6.28 12.98

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Auxiliary Energy measured is for the DHW system only.
Owner has installed space heater on the glycol side of the heat exchanger. This heater will be bypassed during the summer months.
- Instrumentation installed by monitoring contractor on 3 June, 1983
- Qs includes the solar energy delivered to both the pool and the DHW load.
- Qa is the auxiliary energy added to the DHW only.

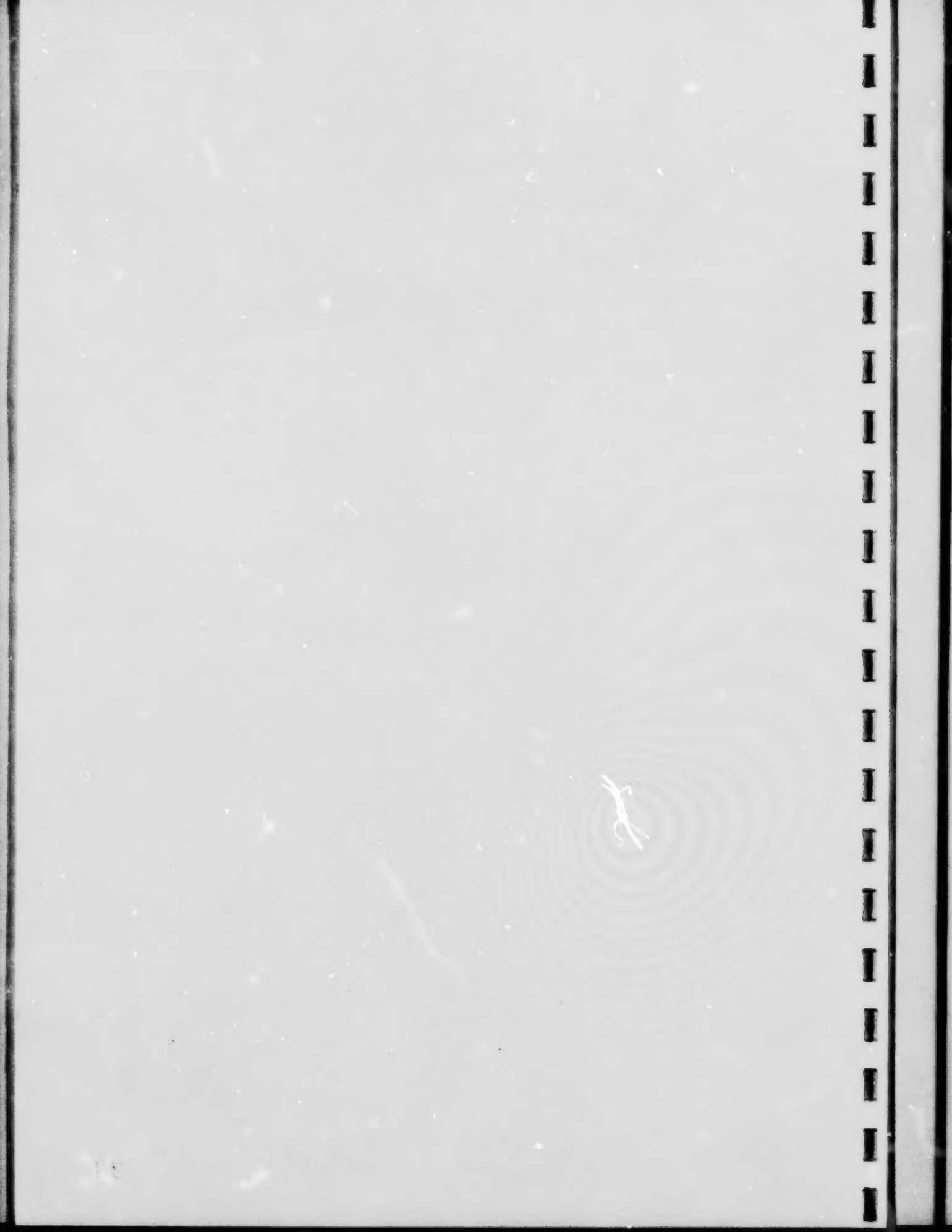
ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Huronia Driftwood Restaurant
Location: Hawkstone, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		18.1	
SEP-82	420		14.1	
OCT-82	279		8.5	
NOV-82	150		2.1	
DEC-82	130		-5.4	
JAN-83	96		-8.9	
FEB-83	252		-8.2	
MAR-83	403		-3.0	
APR-83	510		4.8	
MAY-83	620		11.3	
JUN-83	660		16.5	
JUL-83	682		19.1	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
During Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 128

REPORT DATE: 83/09/30

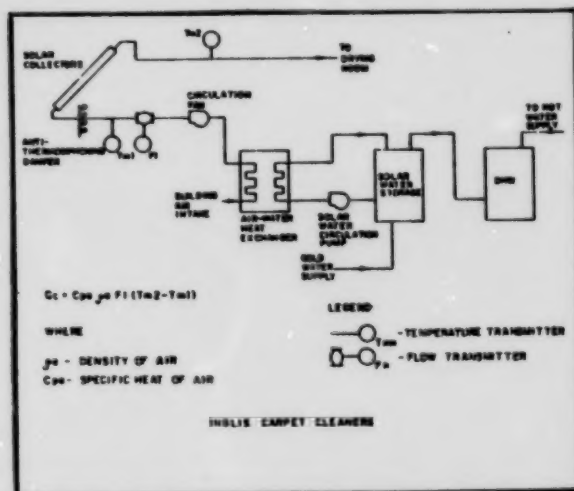
PAGE 1

PROJECT NAME: INGLIS CARPET CLEANERS
Ottawa, Ontario

CONTACT: J. Inglis
TELEPHONE: (613) 225-0272

SERVICE: Hot air for carpet drying and DHW preheat
COMMISSIONING DATE: September 1982 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy Contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: AMHERST 200
Collector Fluid - Air Area - 220 square meters
Number of Collectors - 68
ARRANGEMENT: 2 banks of 22 panels, 1 bank of 24 panels
AUXILIARY HEATERS: Two gas unit heaters
MONITORING INSTRUMENTS: Ontario Research Foundation Single Channel Energy
Meter with an Emerson Flow Transmitter
VARIABLES:
Qs - total useful solar heat delivered to the load

Site number: 128

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Inglis Carpet Cleaners
Location: Ottawa

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82			9.63		-
NOV-82			3.67		-
DEC-82			3.83		-
JAN-83			4.26		-
FEB-83			3.85		-
MAR-83			11.98		-
APR-83			11.81		-
MAY-83			17.38		-
JUN-83			26.28		-
JUL-83			29.22		-

Totals 121.91

Units: Gigajoules.

Comments on System Performance:

- Auxiliary energy is not measured.
- Design predictions 500GJ per year.
- Monitoring contractor will visit the site to verify instrumentation.

Site number: 128

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Inglis Carpet Cleaners
Location: Ottawa

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		19.4	
SEP-82	420		14.6	
OCT-82	279		8.5	
NOV-82	150		1.6	
DEC-82	130		-7.5	
JAN-83	96		-10.8	
FEB-83	252		-9.5	
MAR-83	403		-2.9	
APR-83	510		5.7	
MAY-83	620		12.8	
JUN-83	660		18.1	
JUL-83	682		20.6	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 215

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: W.G. JOHNSON SWIMMING POOL

CONTACT: Wayne Taylor
TELEPHONE: (815)623-1340
ext. # 200

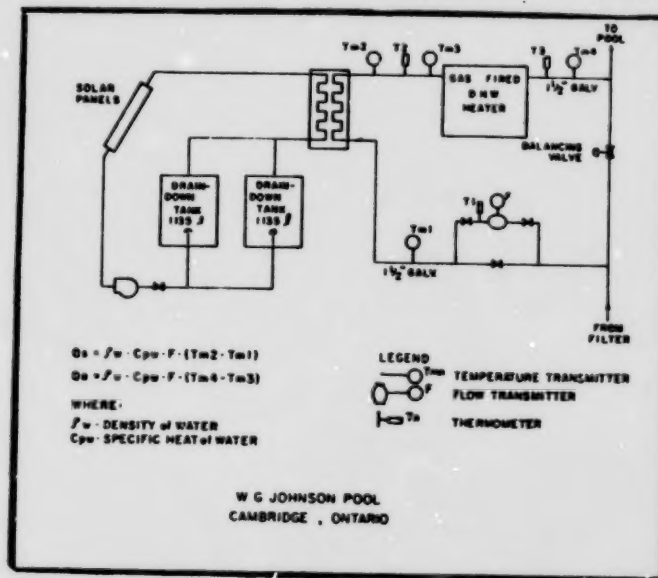
A Canada/Ontario Energy
Demonstration Project

SERVICE: Pool heating

OPERATING TEMPERATURES: 18 Degrees C Inlet; 29 Degrees C Demand

COMMISSIONING DATE: March 1983

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: WATERSHED

Collector Fluid - Water

Number of Collectors - 105

Area - 315 square meters

SOLAR STORAGE: 2270 litres

AUXILIARY HEATERS: Gas fired DHW heater

HEAT EXCHANGERS: Alpha Laval SS P-21

MONITORING INSTRUMENTS: Energy Meter - Rho Sigma Dual Channel, RS 815 FP
Flow Meter - Kent TM 200, 1 1/2"

VARIABLES:

Qs - total useful solar heat delivered to the load

Qa - total useful heat delivered to the same load by auxiliary heat source

Site number: 215

Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: W.G. Johnson Pool
Location: Cambridge

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			27.72 (0.00)	1.98 (0.00)	Monitoring equipment commissioned on June 16, 1983.
JUL-83			57.42 (61.51)	4.09 (0.00)	-
Totals			85.14	6.07	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Mechanical room was flooded by a leaking sight tube located on the solar system.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: W.G. Johnson Pool
Location: Cambridge

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		19.6	
SEP-82	420		15.5	
OCT-82	279		9.3	
NOV-82	150		3.4	
DEC-82	130		-3.2	
JAN-83	96		-6.0	
FEB-83	252		-5.8	
MAR-83	403		-1.0	
APR-83	510		6.4	
MAY-83	620		13.0	
JUN-83	660		17.8	
JUL-83	682		20.6	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 130

REPORT DATE: 83/09/30

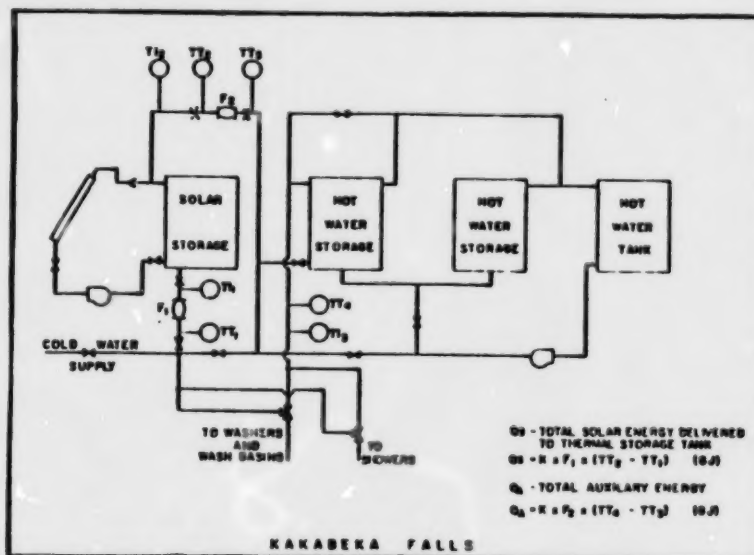
PAGE 1.

PROJECT NAME: KAKABEKA FALLS PROVINCIAL PARK CONTACT: R. Killer
Kakabeka Falls, Ontario. TELEPHONE: (807) 577-4231

OPERATING TEMPERATURES:

COMMISSIONING DATE: May 1981

REPORTING PERIOD: Jan to June 83



Ministry of
Energy contact:
J. Herberman
(416) 965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETRO-SUN Limited
Collector Fluid - Water
Number of Panels - 8
Collector Area - 14.32 square metres

SOLAR STORAGE: 607 litres
AUXILIARY HEATERS: 300,000 BTU/hour
SERVICE: Domestic hot water

MONITORING INSTRUMENTATION: Level A monitoring provided by ISTA energy meters measuring the following variables:

Qs - total useful solar energy delivered to load
Qa - total auxiliary energy

Site number: 130

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Kakabeka Falls Provincial Park
Location: Kakabeka Falls

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			3.21 (3.78)	20.70 (20.13)	-
SEP-82			0.69 (1.91)	2.49 (1.27)	-
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83			0.51 (2.19)	2.61 (0.93)	Park opened May20/83.
JUN-83			1.26 (3.41)	16.68 (14.53)	-
JUL-83			1.12 (4.24)	33.38 (30.26)	-
Totals			6.79	75.85	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

Site number: 130

Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Kakabeka Falls Provincial Park
Location: Kakabeka Falls

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	496		16.7	
SEP-82	360		11.4	
OCT-82	217		6.0	
NOV-82	120		-2.8	
DEC-82	109		-11.3	
JAN-83	96		-15.8	
FEB-83	252		-12.9	
MAR-83	403		-6.3	
APR-83	510		2.6	
MAY-83	605		9.3	
JUN-83	690		14.8	
JUL-83	651		18.1	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

93

Site number: 132

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Long Point Provincial Park
Location: Port Rowan

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			3.11 (2.16)	21.97 (22.93)	-
SEP-82			0.72 (1.30)	1.52 (0.93)	Reduced usage during Sept. and Oct.
OCT-82			0.52 (0.00)	0.99 (0.00)	-
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83			1.85 (1.81)	12.18 (12.22)	Park opened May20/83.
JUN-83			3.52 (1.96)	9.15 (10.71)	-
JUL-83			3.94 (2.21)	25.53 (27.26)	-
Totals			13.66	71.34	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Long Point Provincial Park
Location: Port Rowan

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		20.2	
SEP-82	420		16.3	
OCT-82	279		10.0	
NOV-82	150		4.0	
DEC-82	130		-2.2	
JAN-83	96		-5.3	
FEB-83	252		-4.7	
MAR-83	403		0.0	
APR-83	510		6.5	
MAY-83	620		12.5	
JUN-83	660		18.0	
JUL-83	682		20.7	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 133

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: MAEDEL BEVERAGES
Essex, Ontario

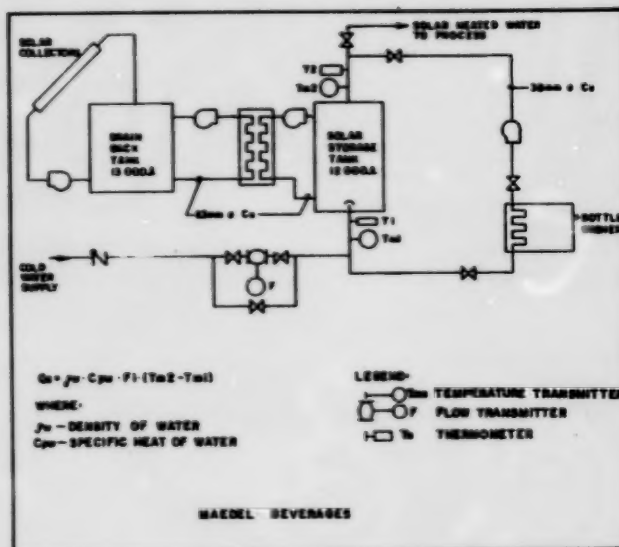
CONTACT: Don Maedel
Bob Maedel
TELEPHONE: (519) 776-7364

SERVICE: Solar Preheat of Process Water
OPERATING TEMPERATURES: 20 Degrees C Inlet; 65 Degrees C Demand

COMMISSIONING DATE: Spt. 1, 1983

REPORTING PERIOD: Aug 82 - July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETROSUN
Collector Fluid - Water
Number of Collectors - 125 Area - 372 square meters
SOLAR STORAGE: 25,000 litres
AUXILIARY HEATERS: Various process equipment, utilizing steam or electrical heating
HEAT EXCHANGERS: Trantor, UX-216-H537, 13.13 square meters
MONITORING INSTRUMENTS: Flow meter - Neptune Trident, 2"
Energy meter - ORF single channel energy meter
VARIABLES:
Qs - total useful solar heat delivered to the load

Site number: 133

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Maedel Beverage
Location: Essex

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83					
JUL-83			4.50 (4.50)	(0.00)	Monitoring equipment repaired and commissioned on July19,1983.

Totals 4.50
Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Auxiliary energy is not presently monitored.

Site number: 133

Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Maedel Beverage
Location: Essex

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical Mean	Measured	Historical Mean	Measured
AUG-82	589		21.3	
SEP-82	420		17.4	
OCT-82	279		11.1	
NOV-82	150		4.4	
DEC-82	130		-1.9	
JAN-83	96		-4.9	
FEB-83	252		-3.8	
MAR-83	403		1.2	
APR-83	510		8.1	
MAY-83	620		14.2	
JUN-83	660		19.7	
JUL-83	682		22.2	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 227**

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: MAPLEVIEW LODGE
Athens, Ontario

CONTACT: C. Gobeil
TELEPHONE: (613)342-4855

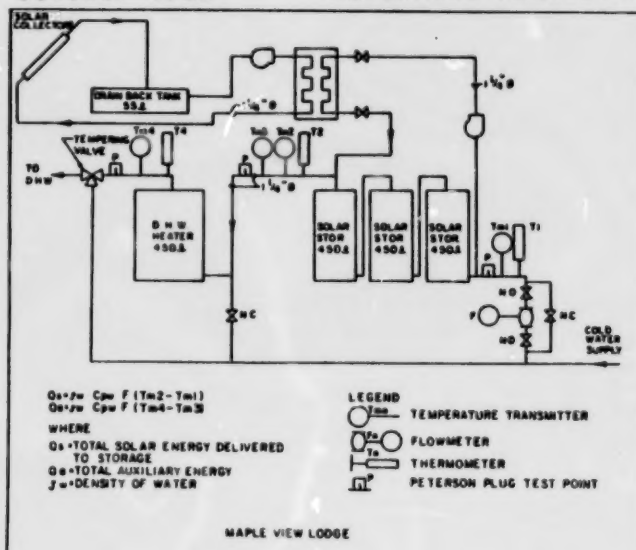
A Canada/Ontario Energy
Demonstration Project

SERVICE: Domestic Hot Water

OPERATING TEMPERATURES: 10 degrees C inlet; 60 degrees C demand

COMMISSIONING DATE: October 1982

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTECH

Collector Fluid - Water

Number of Collectors - 10

Area - 29.7 square meters

SOLAR STORAGE: 1350 litres

AUXILIARY HEATERS: 450 litres oil fired

HEAT EXCHANGERS: Tube and Shell

MONITORING INSTRUMENTS: Flow meter - 1" Kent C-700-FE
Energy meter - dual channel Rho Sigma measuring
solar energy delivered and auxiliary energy
delivered

VARIABLES:

Qs - total useful solar heat delivered to the load

Qa - total useful heat delivered to the same load by auxiliary heat
source

Site number: 227

Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Mapleview Lodge
Location: Athens

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83			0.00		Monitoring equipment
			(0.00)	(0.00)	installed May30/83.
JUN-83			6.63	8.54	-
			(3.93)	(11.24)	
JUL-83			6.76	8.25	-
			(4.29)	(10.72)	
Totals			13.39	16.79	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Mapleview Lodge
Location: Athens

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		19.9	
SEP-82	420		15.6	
OCT-82	279		9.6	
NOV-82	150		3.1	
DEC-82	130		-5.2	
JAN-83	96		-8.5	
FEB-83	252		-7.4	
MAR-83	403		-1.6	
APR-83	510		6.1	
MAY-83	620		13.2	
JUN-83	660		18.4	
JUL-83	682		21.0	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 135

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: MARINER'S COVE RESTAURANT
Ottawa, Ontario

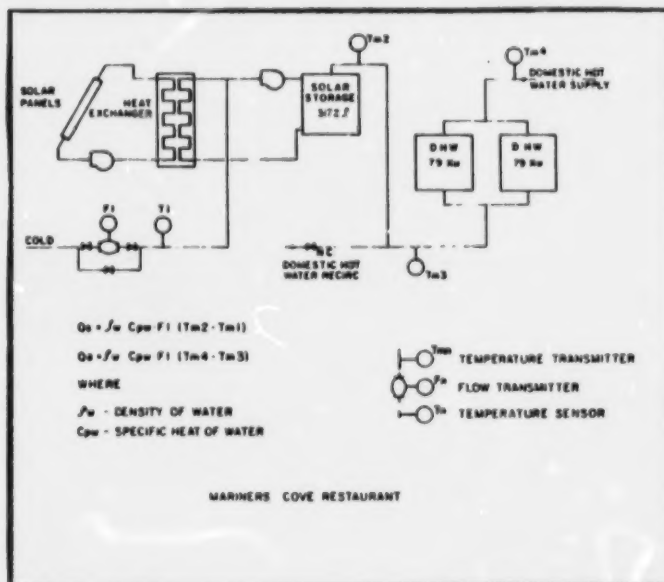
CONTACT: P. Gebert
TELEPHONE: (613) 746-0447

SERVICE: Domestic Hot Water
OPERATING TEMPERATURES: 10 degrees C inlet; 70 degrees C demand

COMMISSIONING DATE: October 1982

REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416) 965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: NORTEC TD1000
Collector Fluid - 50% propylene glycol/water
Number of Collectors - 66 Area - 129 square meters

SOLAR STORAGE: 3172 litres

AUXILIARY HEATERS: 2 - 79 KW gas fixed hot water tanks

HEAT EXCHANGERS: Alfa Laval P22-VL - heat transfer area 4.52 square meters

MONITORING INSTRUMENTS: Flow meter - 1 1/2" Neptune Trident 8
Energy meters - dual channel Ontario Research Foundation energy meter measuring solar energy delivered and auxiliary energy delivered

VARIABLES:

Qs - total useful solar heat delivered to the load
Qa - total useful heat delivered to the same load by auxiliary heat source

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Mariner's Cove Restaurant
Location: Ottawa

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			27.85 (15.77)	32.81 (44.89)	-
JUL-83			24.76 (17.08)	30.87 (38.55)	-

Totals 52.61 63.68

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Instrumentation incorrectly installed by the previous monitoring contractor was repaired and calibrated by the present monitoring contractor on 1 June 1983.

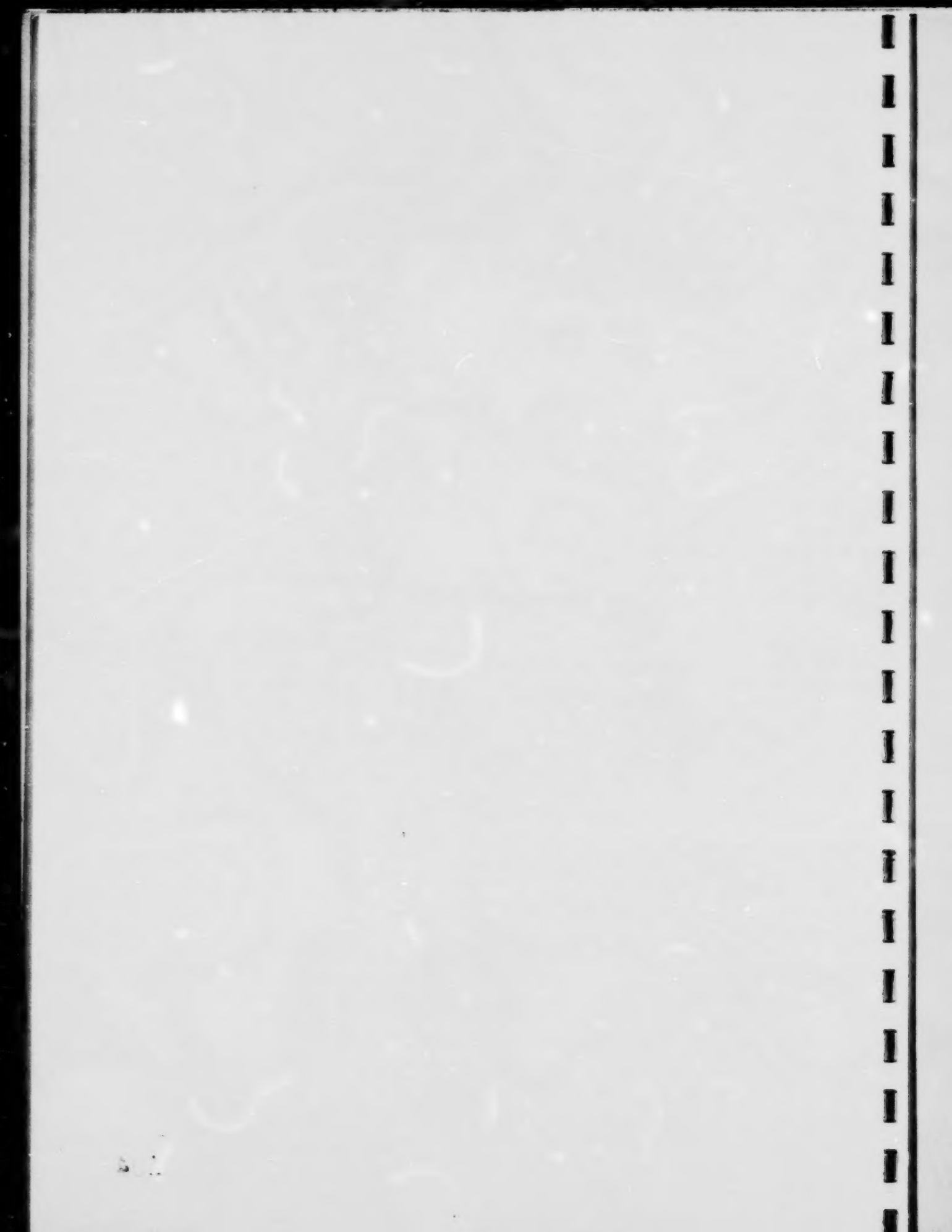
ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Mariner's Cove Restaurant
Location: Ottawa

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m2		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		19.4	
SEP-82	420		14.6	
OCT-82	279		8.5	
NOV-82	150		1.6	
DEC-82	130		-7.5	
JAN-83	96		-10.8	
FEB-83	252		-9.5	
MAR-83	403		-2.9	
APR-83	510		5.7	
MAY-83	620		12.8	
JUN-83	660		18.1	
JUL-83	682		20.6	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 136C

REPORT DATE: 83/09/30

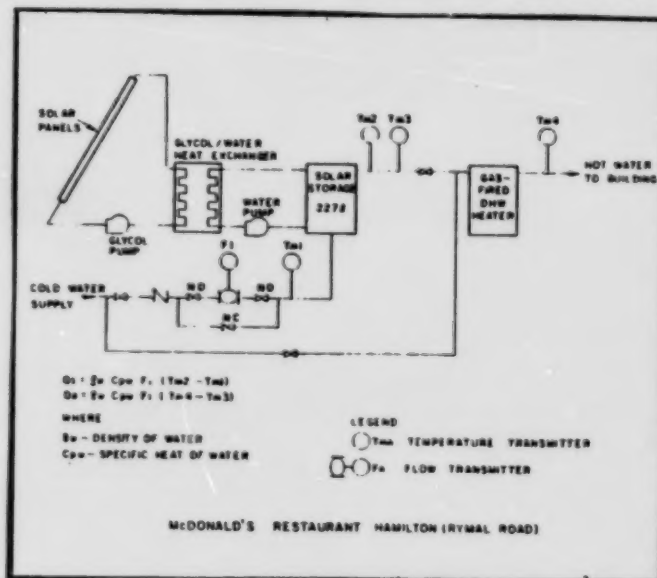
PAGE 1

PROJECT NAME: McDONALD'S RESTAURANT
Rymal Road, Hamilton

CONTACT:
TELEPHONE: (416)387-9282

SERVICE: Domestic Hot Water
OPERATING TEMPERATURES: 5 degrees C inlet; 50 degrees C demand

COMMISSIONING DATE: July 1982 REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTECH Limited
Collector Fluid - 50% propylene, glycol and water
Number of Collectors - 5 Area - 9.5 square meters

SOLAR STORAGE: 322 litres

AUXILIARY HEATERS: RHEEM GLASS model number G156-85

HEAT EXCHANGER: Manufacturer: American Standard Type: Tube and shell
Heat transfer area: 0.4 square meters

MONITORING INSTRUMENTS: Ontario Research Foundation Dual Channel Energy Meter
with temperature transducers and a Neptune 3/4" Trident 8 Flowmeter

VARIABLES:

Qs - total useful solar heat delivered to the load

Qa - total useful heat delivered to the same load by auxiliary heat source

Site number: 136C

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: McDonalds Restaurant
Location: Rymal Road, Hamilton

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83			0.19 (0.00)	6.11 (0.00)	-
JUN-83			0.29 (1.90)	8.91 (7.30)	Site contacts have been requested to provide flow data along with the energy usage data.
JUL-83			0.33 (1.99)	8.00 (6.34)	-
Totals			0.81	23.02	

Units: Gigajoules. Predicted performance is based on the "F Chart" model, using real load data, and historical average weather data.

Comments on System Performance:

- Defective instrumentation installed by previous monitoring contractor was repaired 11 May 1983 by present monitoring contractor.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: McDonalds Restaurant
Location: Rymal Road, Hamilton

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		20.0	
SEP-82	420		15.7	
OCT-82	279		9.4	
NOV-82	150		3.4	
DEC-82	130		-3.4	
JAN-83	96		-6.4	
FEB-83	252		-6.3	
MAR-83	403		-0.8	
APR-83	510		6.1	
MAY-83	620		12.6	
JUN-83	660		18.0	
JUL-83	682		20.0	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 136A

REPORT DATE: 83/09/30

PAGE 1

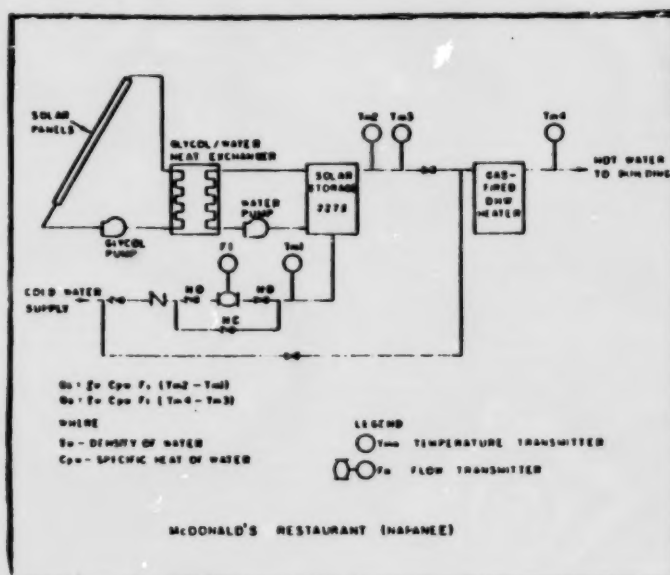
PROJECT NAME: McDONALD'S RESTAURANT
Napane, Ontario.

CONTACT: D. Mac Whirter
TELEPHONE: (613)354-9707

SERVICE: Domestic Hot Water
OPERATING TEMPERATURES: 5 degrees C inlet; 50 degrees C demand

COMMISSIONING DATE: July 1982 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTECH Limited
Collector Fluid - 50% propylene, glycol and water
Number of Collectors - 5 Area - 9.5 square meters
SOLAR STORAGE: 322 litres
AUXILIARY HEATERS: RHEEM GLASS model number G156-85
HEAT EXCHANGER: Manufacturer: American Standard Type: Tube and shell
Heat transfer area: 0.4 square meters
MONITORING INSTRUMENTS: Ontario Research Foundation Dual Channel Energy Meter
with temperature transducers and a Neptune 3/4" Trident 8 Flowmeter
VARIABLES:
Qs - total useful solar heat delivered to the load
Qa - total useful heat delivered to the same load by auxiliary heat source

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: McDonald's Restaurant
Location: Napanee, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			2.39 (0.00)	8.51 (0.00)	-
SEP-82			1.63 (0.00)	8.92 (0.00)	-
OCT-82			0.49 (0.00)	10.41 (0.00)	-
NOV-82			0.61 (0.00)	9.94 (0.00)	-
DEC-82			0.61 (0.00)	10.29 (0.00)	Nov. & Dec. data have been averaged
JAN-83			1.14 (0.00)	9.76 (0.00)	-
FEB-83			1.03 (0.00)	8.82 (0.00)	-
MAR-83			1.14 (0.00)	9.76 (0.00)	-
APR-83			1.60 (0.00)	8.95 (0.00)	-
MAY-83			2.11 (0.00)	8.79 (0.00)	-
JUN-83			2.45 (1.62)	8.10 (8.93)	Auxiliary energy usage is calculated based on the flow data available and a suitable temperature increment.
JUL-83			0.80 (1.83)	5.43 (4.40)	-

Totals

16.00 107.68

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

Site number: 136A

Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

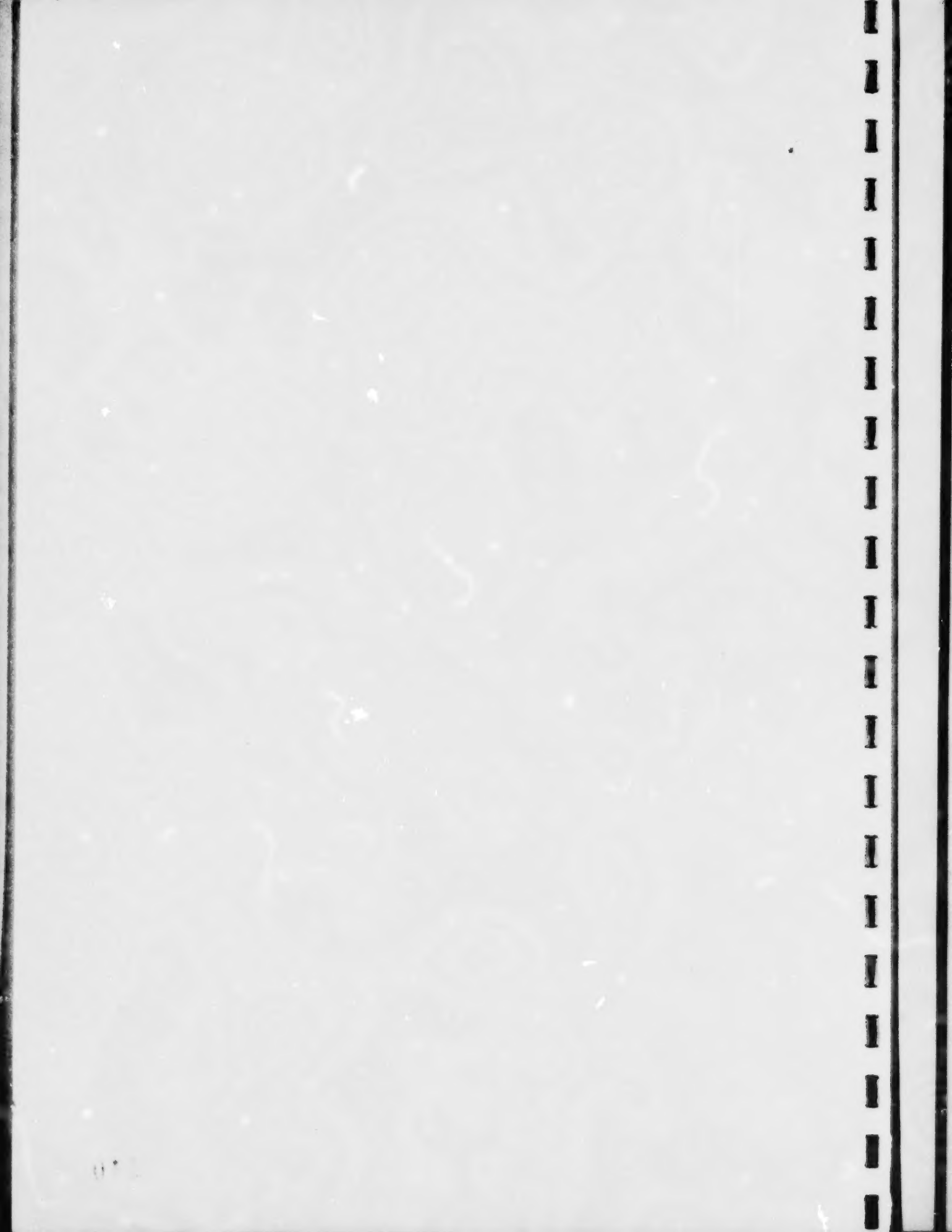
Site: McDonald's Restaurant
Location: Napanee, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		20.2	
SEP-82	420		15.8	
OCT-82	279		9.6	
NOV-82	150		3.4	
DEC-82	130		-4.4	
JAN-83	96		-7.5	
FEB-83	252		-6.5	
MAR-83	403		-1.0	
APR-83	510		6.6	
MAY-83	620		12.9	
JUN-83	660		18.3	
JUL-83	682		21.1	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 136D

REPORT DATE 83/09/30

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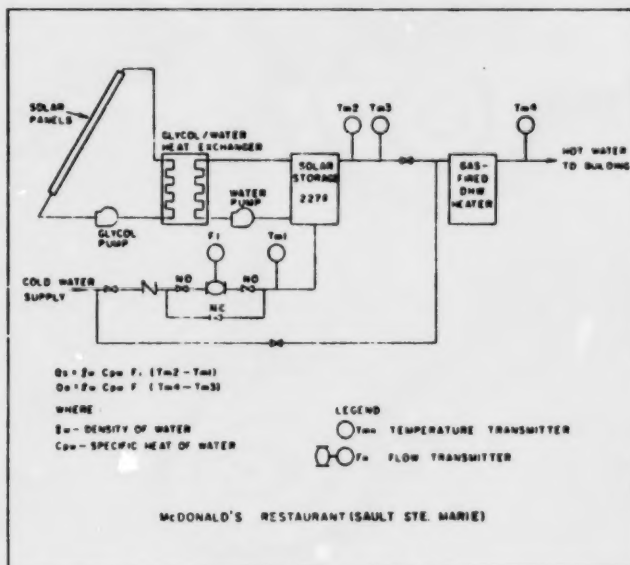
PROJECT NAME McDONALD'S RESTAURANT
SAULT STE. MARIE Ontario.

CONTACT
TELEPHONE

SERVICE Domestic Hot Water

OPERATING TEMPERATURES 5 degrees C inlet; 50 degrees C demand

COMMISSIONING DATE: July 1982 REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact
J. Herberman
(416) 965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTECH Limited

Collector Fluid - 50% propylene glycol and water

Number of Collectors - 5

Area - 9.5 square meters

SOLAR STORAGE: 322 litres

AUXILIARY HEATERS: RHEEM GLASS model number G156-85

HEAT EXCHANGER: Manufacturer: American Standard Type: Tube and shell

Heat transfer area: 0.4 square meters

MONITORING INSTRUMENTS Ontario Research Foundation Dual Channel Energy Meter
with temperature transducers and a Neptune 3/4" Trident 8 Flowmeter

VARIABLES

Qs - total useful solar heat delivered to the load

Qa - total useful heat delivered to the same load by auxiliary heat source

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: McDonald's Restaurant
Location: Sault Sainte Marie

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83					
JUL-83			2.41 (1.90)	8.98 - (9.49)	

Totals

2.41 8.98

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Defective instrumentation installed
by previous monitoring contractor repaired
by current monitoring contractor.
- A mixing valve on the outlet of the domestic
hot water tank makes the auxiliary energy invalid.
Auxiliary energy usage is calculated based on the
flow data available and a suitable temperature
increment.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: McDonald's Restaurant
Location: Sault Sainte Marie

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82				
SEP-82				
OCT-82				
NOV-82				
DEC-82				
JAN-83				
FEB-83				
MAR-83				
APR-83				
MAY-83				
JUN-83				
JUL-83				

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 136B

REPORT DATE: 83/09/30

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PROJECT NAME: McDONALD'S RESTAURANT
Toronto, Ontario.

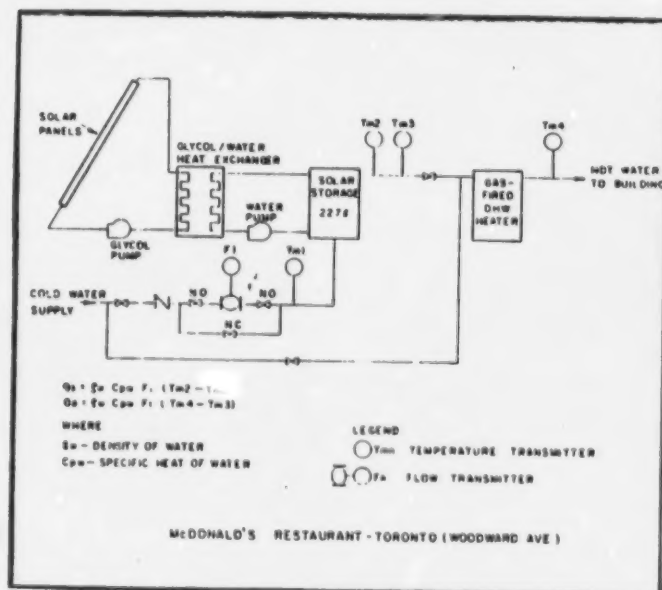
CONTACT: U. Sheviak
TELEPHONE: (416)463-2124

SERVICE: Domestic Hot Water

OPERATING TEMPERATURES: 5 degrees C inlet; 50 degrees C demand

COMMISSIONING DATE: July 1982 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTECH Limited
Collector Fluid - 50% propylene, glycol and water
Number of Collectors - 5 Area - 9.5 square meters

SOLAR STORAGE: 322 litres

AUXILIARY HEATERS: RHEEM GLASS model number G156-85

HEAT EXCHANGER: Manufacturer: American Standard Type: Tube and shell
Heat transfer area: 0.4 square meters

MONITORING INSTRUMENTS: Ontario Research Foundation Dual Channel Energy Meter
with temperature transducers and a Neptune 3/4" Trident 8 Flowmeter

VARIABLES:
 Q_s - total useful solar heat delivered to the load
 Q_a - total useful heat delivered to the same load by auxiliary heat source

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: McDonalds Restaurant
Location: Woodward Ave. Toronto

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			2.34 (1.94)	10.86 (11.26)	Auxiliary energy usage is calculated based on the flow data available and a suitable temperature increment.
JUL-83			0.45 (2.03)	10.25 (8.67)	-
Totals			2.79	21.11	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Defective instrumentation installed by previous monitoring contractor was repaired 13 May 1983 by present monitoring contractor.

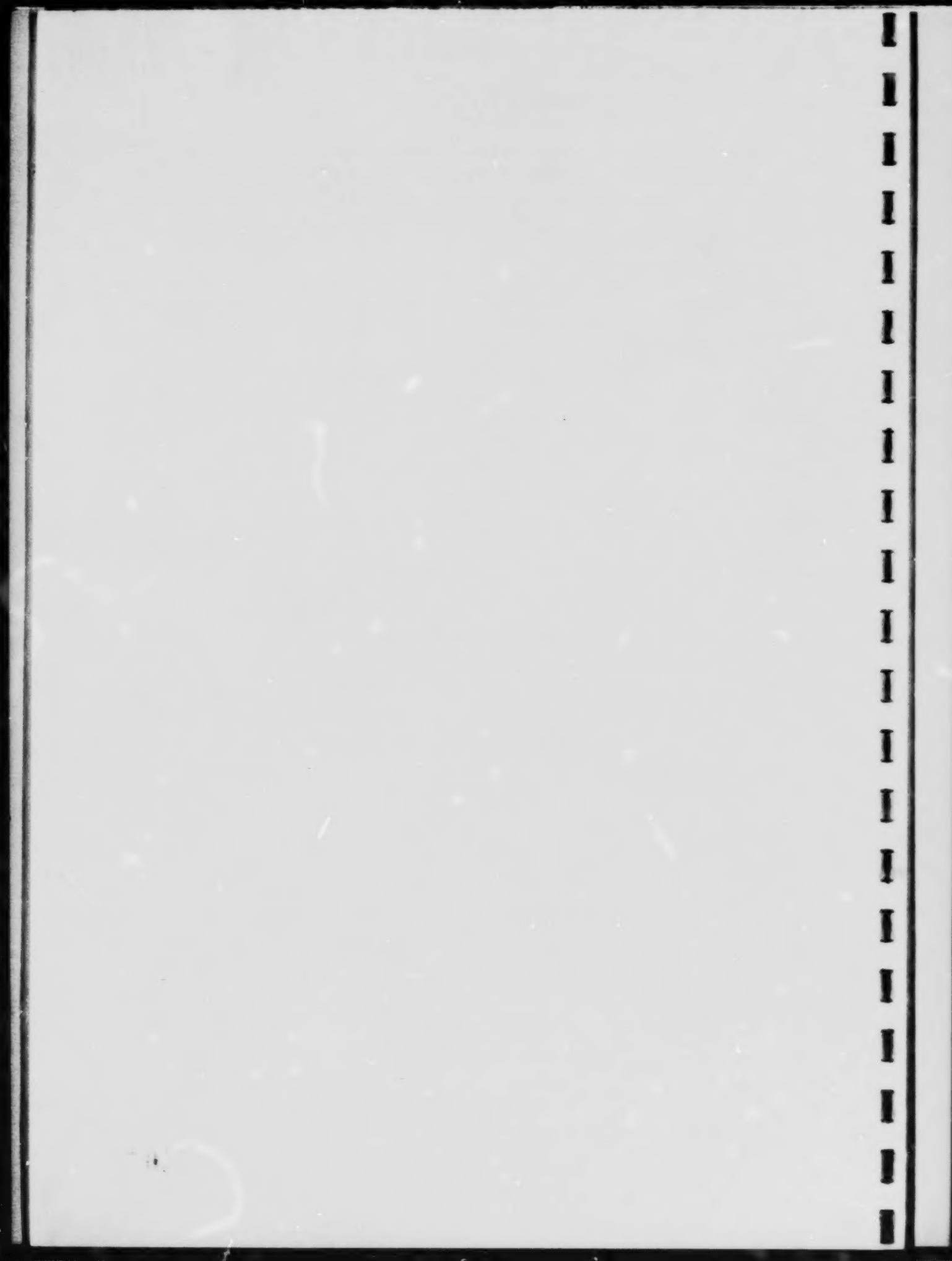
ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: McDonalds Restaurant
Location: Woodward Ave. Toronto

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		19.8	
SEP-82	420		16.1	
OCT-82	279		10.0	
NOV-82	150		3.9	
DEC-82	130		-2.5	
JAN-83	96		-5.3	
FEB-83	252		-4.9	
MAR-83	403		-0.3	
APR-83	510		6.2	
MAY-83	620		11.9	
JUN-83	660		17.6	
JUL-83	682		20.6	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 136E

REPORT DATE: 83/09/30

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PROJECT NAME: McDONALD'S RESTAURANT
Dougal Rd., Windsor, Ont.

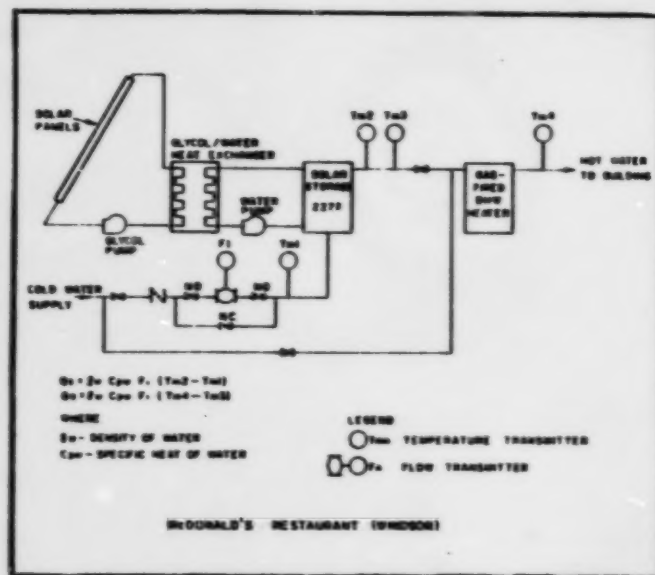
CONTACT: T. CRUMB
TELEPHONE: (519)966-0454

SERVICE: Domestic Hot Water

OPERATING TEMPERATURES: 4 degrees C inlet; 50 degrees C demand

COMMISSIONING DATE: July 1982 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTECH Limited
Collector Fluid - 50% propylene glycol and water
Number of Collectors - 5 Area - 9.5 square meters

SOLAR STORAGE: 454 litres

AUXILIARY HEATERS: RHEEM GLASS model number G156-85

HEAT EXCHANGER: Manufacturer: American Standard Type: Tube and shell
Heat transfer area: 0.4 square meters

MONITORING INSTRUMENTS: Ontario Research Foundation Dual Channel Energy Meter
with temperature transducers and a Neptune 3/4" Trident 8 Flowmeter.

VARIABLES:

Qs - total useful solar heat delivered to the load

Qa - total useful heat delivered to the same load by auxiliary heat source

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: McDonald's Restaurant
Location: 3354 Dougall Rd. Windsor, Ont.

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83			0.00 (0.00)	9.36 (0.00)	-
FEB-83			1.05 (0.00)	7.41 (0.00)	-
MAR-83			1.50 (0.00)	7.86 (0.00)	-
APR-83			2.83 (0.00)	6.23 (0.00)	-
MAY-83			1.91 (0.00)	7.45 (0.00)	-
JUN-83			1.77 (1.61)	7.40 (7.56)	Auxiliary energy usage is calculated based on the flow data available and a suitable temperature increment.
JUL-83			1.84 (1.84)	5.14 (5.14)	-
Totals			10.90	50.85	

Units: Gigajoules. Predicted performance is based on the "F Chart" model, using real load data, and historical average weather data.

Comments on System Performance:

- Defective bypass valve repaired 1 Feb. 1983. The system and monitoring instrumentation are now operating.
- Auxiliary energy usage has been calculated based on the actual DHW usage and a suitable temperature differential.

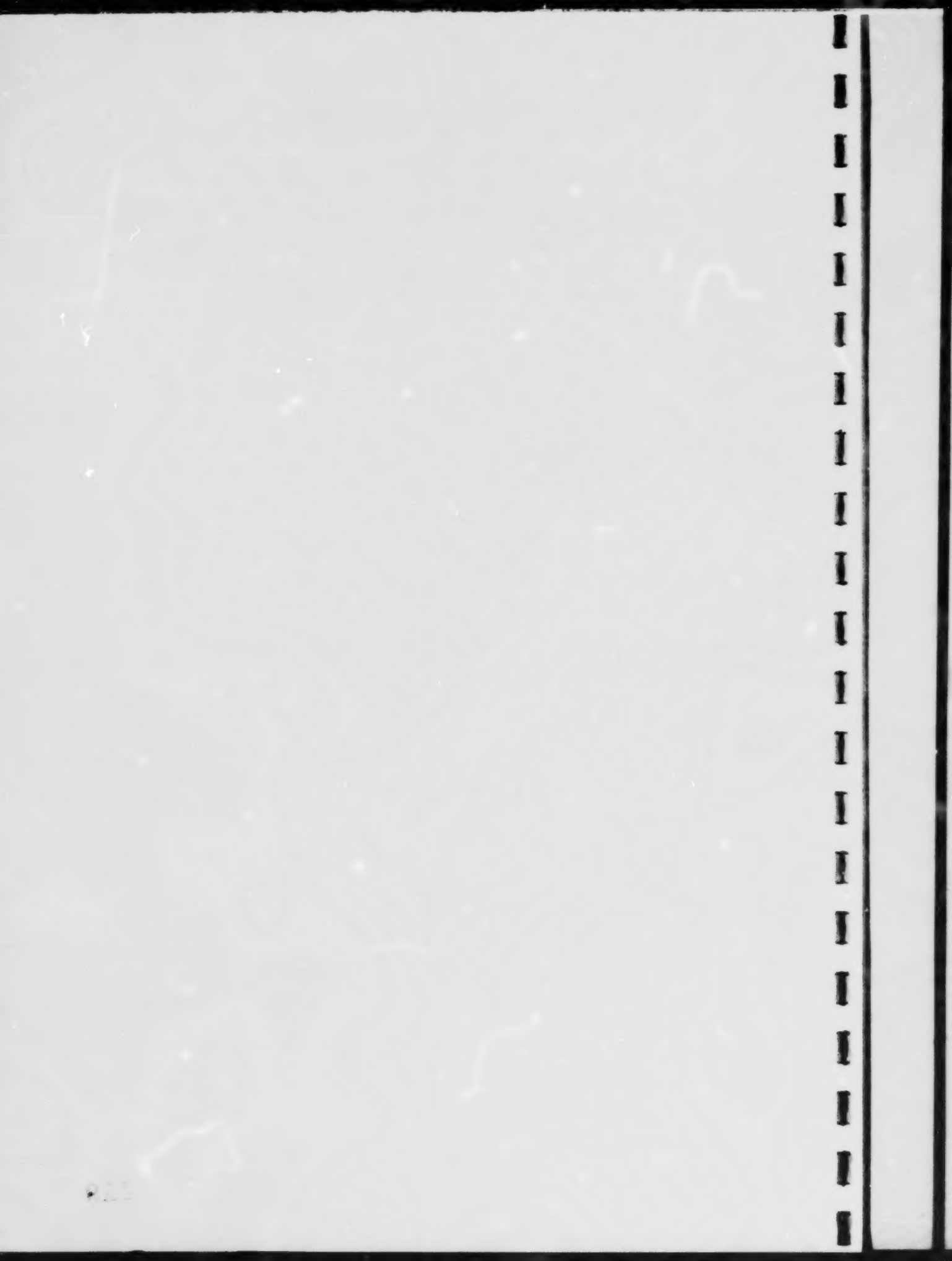
ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: McDonald's Restaurant
Location: 3354 Dougall Rd. Windsor, Ont.

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m2		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		21.3	
SEP-82	420		17.4	
OCT-82	279		11.1	
NOV-82	150		4.4	
DEC-82	130		-1.9	
JAN-83	96		-4.9	
FEB-83	252		-3.8	
MAR-83	403		1.2	
APR-83	510		8.1	
MAY-83	620		14.2	
JUN-83	660		19.7	
JUL-83	682		22.2	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 137

REPORT DATE: 83/09/30

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PROJECT NAME: MEDALLION FILM LABORATORIES

CONTACT: Chris Turner
TELEPHONE: (416) 977-0019

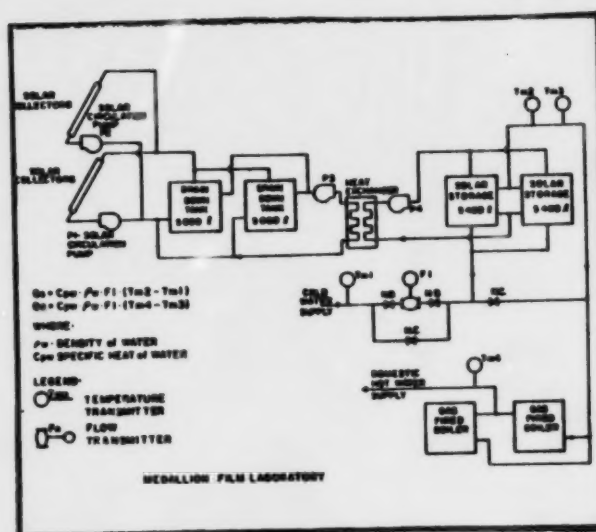
SERVICE: Process water

OPERATING TEMPERATURES: 5 degrees C inlet, 48 degrees C demand

COMMISSIONING DATE: October 1982

REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETROSUN

Collector Fluid - Water (drain down system)

Number of Collectors - 141

Area - 336 square meters

SOLAR STORAGE: 10000 litres drain down

10800 litres solar storage

AUXILIARY HEATERS: 2 gas fired boilers (223 KW)

HEAT EXCHANGER: Alfa Laval P22VL; heat transfer area 6.48 square meters

MONITORING INSTRUMENTS: 2" Trident 8 Neptune flow meter

Dual ORF energy meter

VARIABLES:

Q_s - total useful solar heat delivered to the load

Q_a - total useful heat delivered to the same load by auxiliary heat source

Site number: 137

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Medallion Film Laboratories
Location: Toronto

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83			26.23	38.12	-
			(34.56)	(29.79)	
MAY-83			49.45	51.46	-
			(40.87)	(60.04)	
JUN-83			64.92	44.19	-
			(41.79)	(67.32)	
JUL-83			58.47	38.04	-
			(47.68)	(48.83)	

Totals 199.07 171.81
Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Defective instrumentation installed by previous monitoring contractor was repaired and recalibrated by present monitoring contractor on April 14, 1983. Monitoring data are being collected.

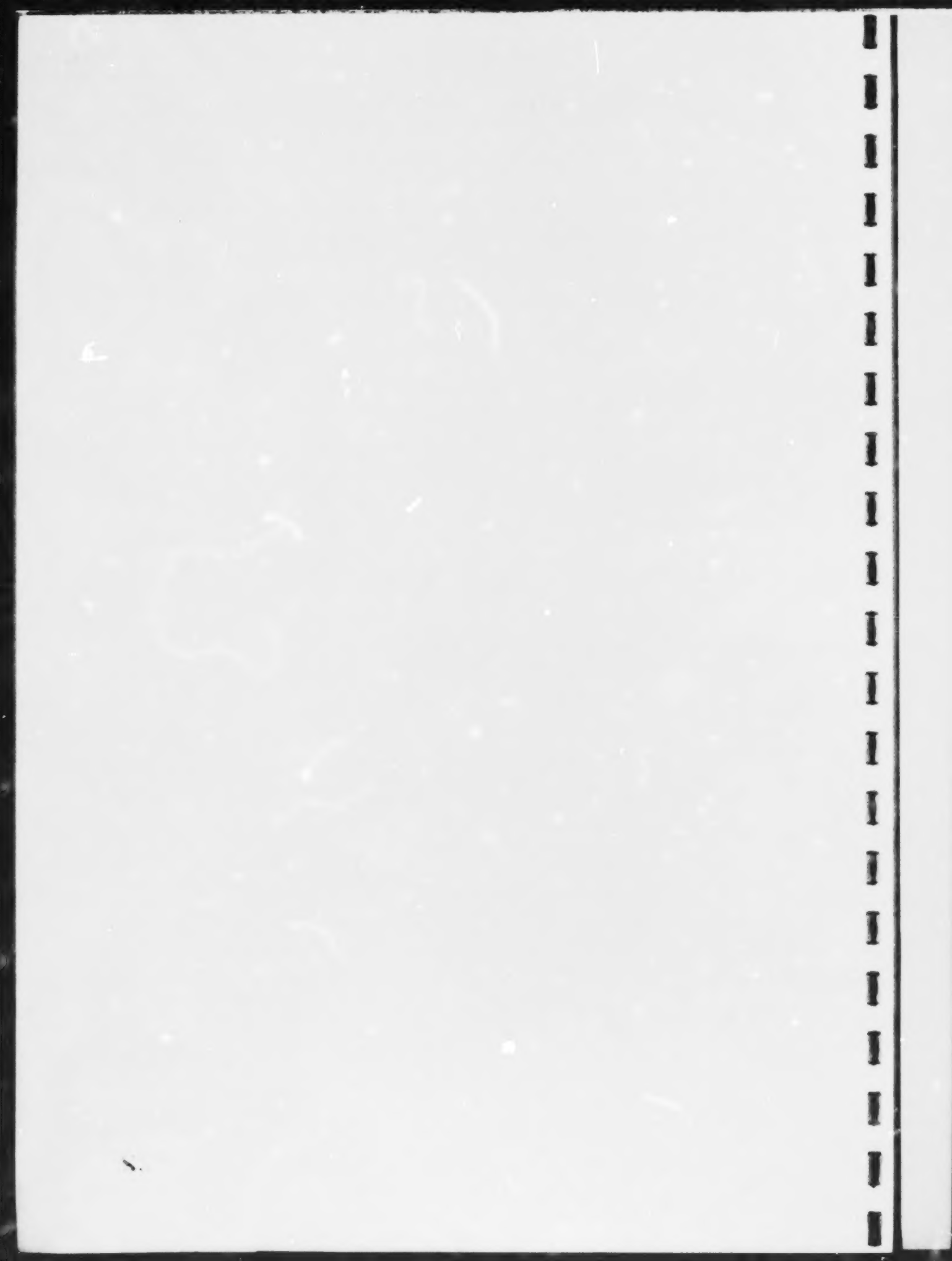
ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Medallion Film Laboratories
Location: Toronto

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m2		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		21.2	
SEP-82	420		17.1	
OCT-82	279		11.0	
NOV-82	150		4.9	
DEC-82	130		-1.6	
JAN-83	96		-4.6	
FEB-83	252		-3.9	
MAR-83	403		0.7	
APR-83	510		7.6	
MAY-83	620		13.6	
JUN-83	660		19.1	
JUL-83	682		22.0	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 101

REPORT DATE: 83/09/30

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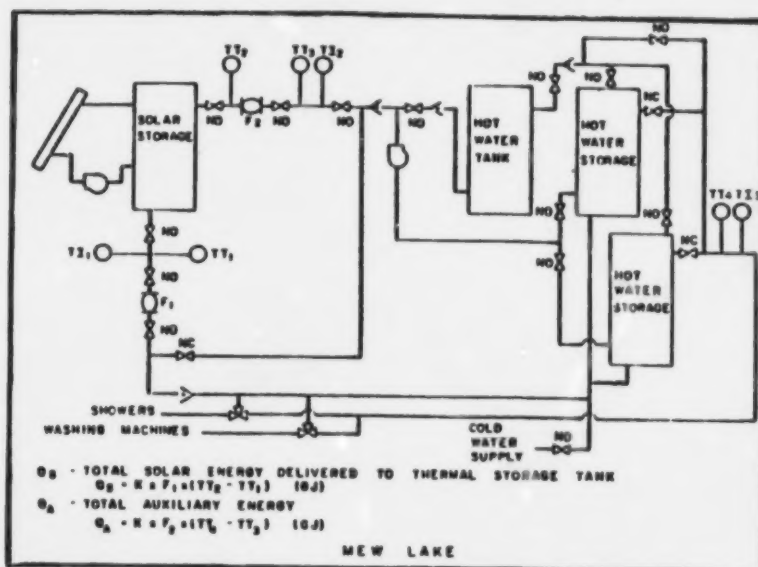
PROJECT NAME: MEW LAKE,
Algonquin Provincial Park,
Ontario

CONTACT: T. Millard
TELEPHONE: (705) 637-2780

OPERATING TEMPERATURES:

COMMISSIONING DATE: May 1981

REPORTING PERIOD: Jan to June 83



Ministry of
Energy contact:
J. Herberman
(416) 965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS:

Manufacturer: SOLATHERM Limited
Collector Fluid - Water
Number of Panels - 9
Collector Area - 16.1 square metres

SOLAR STORAGE:

311 litres

AUXILIARY HEATERS:

360,000 BTU/hour; 284 litres with 493 litres hot

water storage

SERVICE:

Domestic hot water

MONITORING INSTRUMENTATION: Level A monitoring provided by ISTA energy meters measuring the following variables:

Qs - total useful solar energy delivered to load

Qa - total auxiliary energy

Site number: 101

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Report Date: JUL/93

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: New Lake Provincial Park
Location: Algonquin Park

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			0.00 (0.00)	(0.00)	-
SEP-82			0.00 (0.00)	(0.00)	-
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83			0.00 (0.00)	(0.00)	-
JUN-83			0.00 (0.00)	(0.00)	Monitoring data will be available for July.
JUL-83			1.68 (3.72)	4.62 (2.58)	-

Totals 1.68 4.62

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- The solar system has been reconfigured but the instrumentation was incorrectly reinstalled. No monitoring results are available but the solar system is operating satisfactorily.
- Solar system had been modified by M.N.R. plumber, rendering the monitoring equipment inoperative. This was repaired on a site visit by the monitoring contractor, July 19/83.
- Monitoring equipment was reinstalled in the proper location July 19, 1983 after having been moved during system modifications.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: New Lake Provincial Park
Location: Algonquin Park

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		17.2	
SEP-82	420		12.7	
OCT-82	279		6.8	
NOV-82	150		-0.2	
DEC-82	130		-8.7	
JAN-83	96		-11.9	
FEB-83	232		-11.1	
MAR-83	403		-5.3	
APR-83	510		2.7	
MAY-83	620		10.6	
JUN-83	660		15.9	
JUL-83	682		18.3	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 217**

REPORT DATE: 83/09/30

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PROJECT NAME: MINUTE CAR WASH
Ottawa, Ontario

CONTACT: V. Miville
TELEPHONE: (613)236-7328

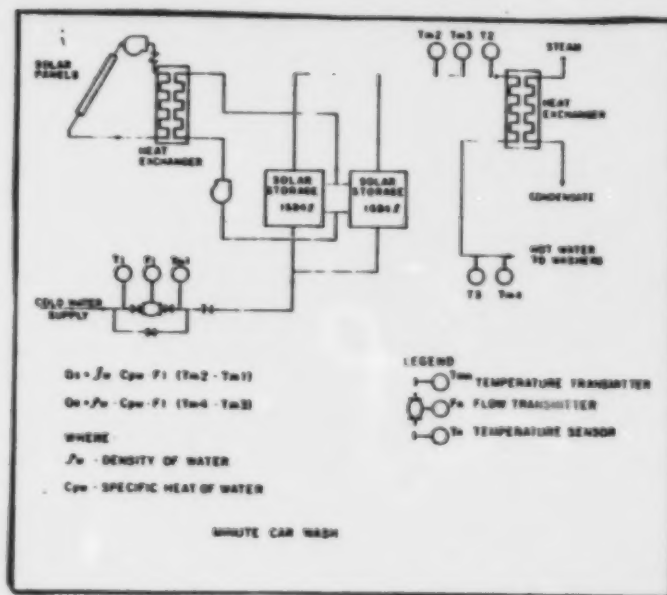
A Canada/Ontario Energy
Demonstration Project

SERVICE: Preheat for car wash

OPERATING TEMPERATURES: 10 degrees C inlet; 42 degrees C demand

COMMISSIONING DATE: May 1983

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: NORTEC TD1000
Collector Fluid - 50% propylene glycol/water
Number of Collectors - 84 Area - 164 square meters

SOLAR STORAGE: 3370 litres

AUXILIARY HEATERS: Steam Heat Exchangers

HEAT EXCHANGERS: ALFA LAVAL P22-VL - heat transfer area 9.02 square meters

MONITORING INSTRUMENTS: Flow meter - 3" Kent TM2000

Energy meter - dual channel Rho Sigma energy meter
measuring solar energy delivered and auxiliary
energy delivered

VARIABLES:

Qs - total useful solar heat delivered to the load

Qa - total useful heat delivered to the same load by auxiliary heat
source

Site number: 217

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Minute Car Wash
Location: Ottawa

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83			0.00	-	
			(0.00)	(0.00)	
JUN-83			31.32	2.04	-
			(19.85)	(13.51)	
JUL-83			38.30	0.19	Feed to the auxiliary
			(22.21)	(16.28)	heat exchanger is
					shut off.
Totals			69.62	2.23	

Units: Gigajoules. Predicted performance is based on the "Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Instrumentation installed by the monitoring contractor on 2 June 1983.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Minute Car Wash
Location: Ottawa

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		19.4	
SEP-82	420		14.6	
OCT-82	279		8.5	
NOV-82	150		1.6	
DEC-82	130		-7.5	
JAN-83	96		-10.8	
FEB-83	252		-9.5	
MAR-83	403		-2.9	
APR-83	510		5.7	
MAY-83	620		12.8	
JUN-83	660		18.1	
JUL-83	682		20.6	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 139

REPORT DATE: 83/09/30

PAGE 1.

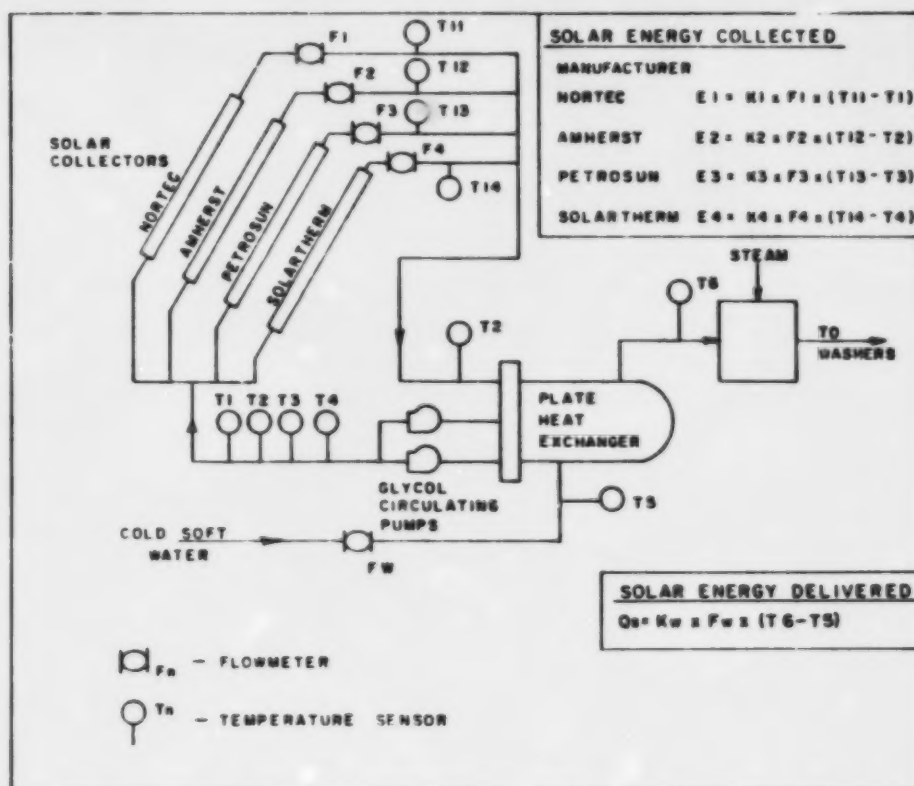
PROJECT NAME: MOHAWK HOSPITAL SERVICES INC. CONTACT: Eric Shipley
Hamilton, Ontario. (416)388-2118

A Canada/Ontario Energy
Demonstration Project

SERVICE: Hot water for laundry.
COMMISSIONING DATE: September 1982

REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

Service: Laundry Hot Water
Solar Storage: None
Solar Collector: Four manufacturers

Manufacturer	Collector Unit Area	# of Collectors	Collector Area (m2)
Nortec	1.95 m2	270	526.5
Amherst	2.80 m2	166	464.8
Petrosun	2.98 m2	174	520.3
Solarttherm	2.30 m2	216	500.3

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

REPORT DATE 83/09/30

PAGE 2

PROJECT NAME MOHAWK HOSPITAL SERVICES INC
Hamilton Ontario.

COMMISSIONING DATE September 23 1982. REPORTING PERIOD: Aug 82-July 83

COLLECTOR FLUID. Glycol(50%) Water(50%)

COLLECTOR FLUID CIRCULATING PUMPS: 2-S.A. Armstrong #2D4380
Capacity 145 USGPM @ 85ft. of water

HEAT EXCHANGER Alfa Laval #P31-HX Plate Type

AUXILIARY ENERGY Purchased Steam

MONITORING INSTRUMENTATION: The solar energy collected by each of the four manufacturer's arrays of panels is monitored as well as the total solar energy delivered to the laundry's hot water heating system. The arrangement of the energy meters is shown in the schematic. The auxilliary energy supplied by the purchased steam is obtained at the end of each of the laundry's thirteen twenty-eight day operating periods

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

REPORT DATE: 83/09/30

PAGE 3

PROJECT NAME: MOHAWK HOSPITAL SERVICES INC

LOCATION: HAMILTON ONTARIO

REPORTING PERIOD: August 82 to July 83

EXPECTED PERFORMANCE: The feasibility study for the project predicted that the solar system would contribute 7700 GJ annually to the hot water heating system based on a total collector area of 2500 square meters. The consultant's predictions corrected for the "as built" total collector area (2012 square meters) are as follows

(Units: Energy - gigajoules/Temperatures - C)

JAN	237
FEB	293
MAR	484
APR	623
MAY	711
JUN	764
JUL	868
AUG	894
SEP	664
OCT	406
NOV	163
DEC	93

TOTAL = 6200

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

REPORT DATE: 83/09/30

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PROJECT NAME: MOHAWK HOSPITAL SERVICES INC.

LOCATION: HAMILTON ONTARIO

REPORTING PERIOD: August 82 to July 83

DATA

(UNITS: Energy - gigajoules / Temperatures - C)

	Qs(N)	Qs(A)	Qs(P)	Qs(S)	Qs Total	Qa	Qt
DEC	5.33	6.59	7.87	2.03	74.06	5514.00	5588.06
JAN	0.00	8.74	5.88	7.94	31.12	5214.70	5245.82
FEB	15.47	24.03	0.27	29.49	84.51	6001.00	6085.51
MAR	20.67	37.93	48.52	35.64	243.39	5676.55	5919.94
APR	20.56	37.67	45.25	0.28	322.76	5718.39	6041.15
MAY	37.75	60.59	73.01	0.89	299.32	5049.53	5348.85
JUN	70.74	91.42	109.74	58.38	377.80	4335.38	4713.18
JUL	69.64	85.19	99.89	93.58	363.42	4075.84	4439.26
AUG							
SEP							
OCT							
NOV							
DEC							

Comments:

1. Flow meters on Nortec and Solartherm stopped transmitting during Dec
2. Nortec register frozen - repaired 4 February 1983
3. Flow meter on Petrosun not transmitting during February. Repaired by monitoring contractor 28 Feb 1983
4. Contact has reported some problems with leaks on the couplings for the Amherst panels
5. Contact has reported that two of the Nortec panels had lost their vacuum
6. Flow meter on Solartherm operating intermitently during April.

(N)-Nortec
(A)-Amherst
(P)-Petrosun
(S)-Solartherm

Site Number: 139

Report Date Jul/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site MOHAWK HOSPITAL SERVICES INC
Location: Hamilton Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m2		Monthly Mean Ambient Temperature C	
	Historical Mean	Measured	Historical Mean	Measured
Aug 82	589		20.0	
Sep 82	420		15.7	
Oct 82	279		9.4	
Nov 82	150		3.4	
Dec 82	130		-3.4	
Jan 83	96		-6.4	
Feb 83	252		-6.3	
Mar 83	403		-0.8	
Apr 83	510		6.1	
May 83	620		12.6	
Jun 83	660		18.0	
Jul 83	682		20.0	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during previous 12 months

**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 142**

REPORT DATE: 83/09/30

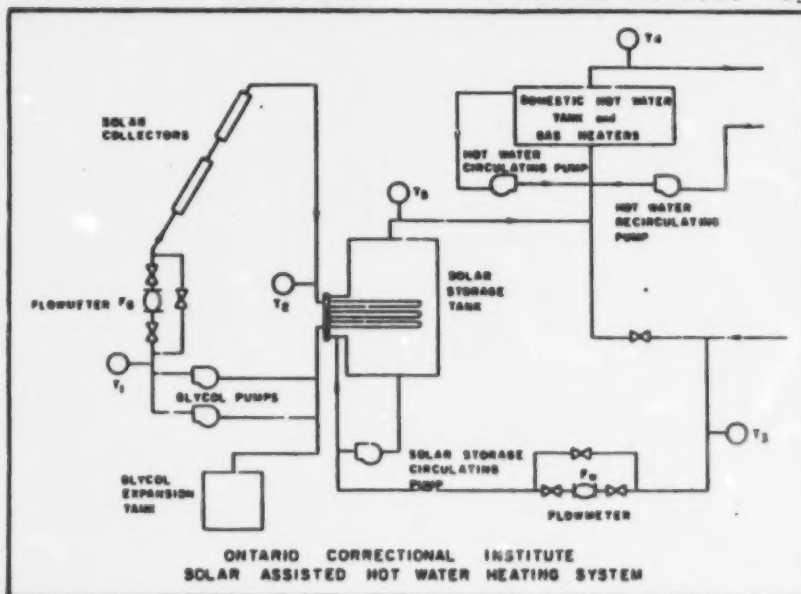
PAGE 1.

PROJECT NAME: ONTARIO CORRECTIONAL INSTITUTE
Brampton, Ontario.

CONTACT: D. Allen
TELEPHONE: (416) 457-7050

COMMISSIONING DATE: June 1980

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact
J. Herberman
(416) 965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: TEMSPEC Limited
Collector Fluid - 50% Propylene Glycol/Water; 56 panels, collector area 94.89 square metres
Arrangement: 28 pairs of panels in series in two banks

HEAT EXCHANGER: A.S. Leach Model 8-4-87 JWSX SIZE: Transfer area 5.2 m²

SOLAR STORAGE: 1 - 7570 litre tank with circulating pump

AUXILIARY HEATERS: Two gas fired hot water heaters
Capacity: 87.9 KW each

SERVICE: Circulating Domestic Hot Water

MONITORING INSTRUMENTATION: Level B monitoring system provided by Ont. Research Foundation with MATER data recording variables recorded.

Qi-Total Incident Solar Energy Qc-Total Solar Energy Transferred
Qs-Solar Energy Delivered to load to solar storage tank
Qa-Auxiliary (gas) Heat Supplied Tst-Solar storage tank temperature
Tamb-Ambient Temperature (at Collector) S-Glycol Pump Motor 'on-time'

EXPECTED PERFORMANCE: (based on Ministry of Energy Project #3325 Solar Domestic Hot Water Heating Feasibility - Ontario Correctional Institute July 1978)

	Annual	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Total Energy Demand:	850	74	76	77	75	75	70	70	68	64	65	68	71
Solar Energy:	260	--	--	--	--	--	--	--	--	--	--	--	--
Solar Fraction:	0.31	--	--	--	--	--	--	--	--	--	--	--	--
(Energy Units: gigajoules)													

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Ontario Correctional Institute
Location: Brampton, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82	.		27.47 (19.37)	56.41 (65.51)	-
SEP-82			22.00 (16.59)	71.21 (76.62)	-
OCT-82			20.14 (15.05)	93.04 (98.13)	-
NOV-82			10.83 (6.88)	109.89 (113.84)	-
DEC-82	11.29	0.00	7.55 (4.56)	126.60 (129.59)	-
JAN-83	27.67	0.00	13.76 (8.17)	115.99 (121.58)	-
FEB-83	27.67	0.00	13.46 (11.29)	116.29 (118.46)	-
MAR-83	38.51	8.46	21.89 (14.79)	119.01 (126.11)	-
APR-83	30.21	17.54	18.34 (14.03)	106.89 (111.20)	-
MAY-83	53.88	25.65	31.75 (16.24)	148.68 (164.19)	-
JUN-83	53.78	26.62	31.05 (16.71)	95.55 (109.89)	-
JUL-83	55.21	30.99	31.42 (17.68)	50.80 (64.54)	-

Totals 298.22 109.26 249.66 1210.36

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- A level 8 monitoring report covering the period from February 1981 to January 1982 has been prepared by the Ontario Research Foundation.
- Defective Neptune flow meter in solar collected monitoring has been repaired by the manufacturer.
- Solar monitoring instrumentation was checked by O.R.F.

Report Date: JUL/83

Site number: 152

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: St. Andrews Place
Location: Sudbury

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical		Historical	
	Mean	Measured	Mean	Measured
AUG-82	589		18.4	
SEP-82	420		13.7	
OCT-82	279		7.8	
NOV-82	150		0.4	
DEC-82	130		-8.1	
JAN-83	96		-12.3	
FEB-83	252		-10.4	
MAR-83	403		-4.5	
APR-83	510		4.0	
MAY-83	620		11.7	
JUN-83	660		17.2	
JUL-83	682		19.8	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 220

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: PORRITTS AND SPENCER

CONTACT: Peter Ohagan
TELEPHONE:

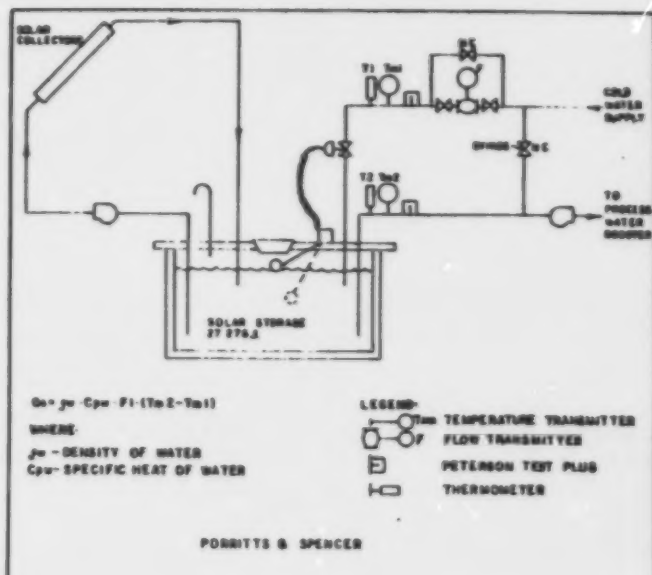
SERVICE: Process Water

OPERATING TEMPERATURES: 7 Degrees C Inlet; 49 Degrees C Demand

COMMISSIONING DATE April 1 1983

REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: ENERSOURCE

Collector Fluid - Water

Number of Collectors - 304

Area - 649 square meters

SOLAR STORAGE: 27 276 litres

AUXILIARY HEATERS: Steam

HEAT EXCHANGERS: None

MONITORING INSTRUMENTS

Flow meter: 3" Kent TM2000

Energy Meter: Rho Sigma RS805FP Single Channel

VARIABLES

Qs - total useful solar heat delivered to the load

Site number: 220

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Perritts and Spencer
Location: Hamilton

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83					
JUL-83			1.76 (1.76)	(0.00)	-

Totals 1.76

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Qa is not monitored at this site .
- Monitoring equipment commissioned July14,1983.

Site number: 220

Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Porritts and Spencer
Location: Hamilton

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		20.0	
SEP-82	420		15.7	
OCT-82	279		9.4	
NOV-82	150		-3.4	
DEC-82	130		-3.4	
JAN-83	96		-6.4	
FEB-83	252		-6.3	
MAR-83	403		-0.8	
APR-83	510		6.1	
MAY-83	620		12.6	
JUN-83	660		18.0	
JUL-83	682		20.5	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
During Previous 12 Months:

**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 161**

REPORT DATE: 83/09/30

PAGE 1.

PROJECT NAME: PROVINCIAL GOVERNMENT BUILDING,
Sudbury, Ontario.

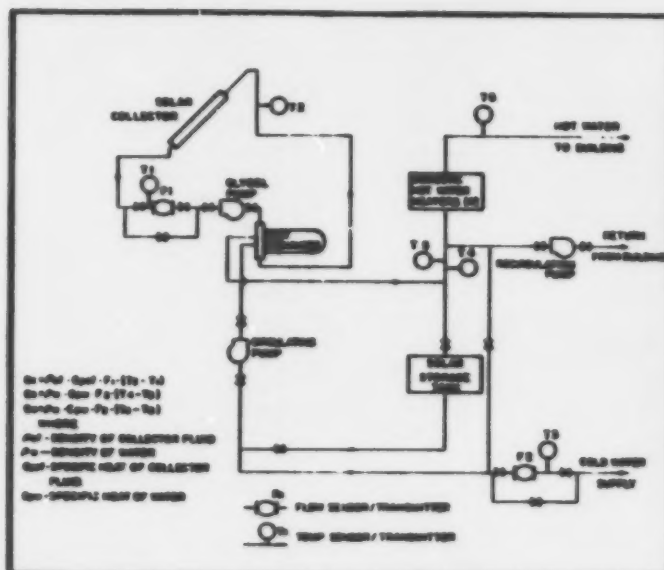
CONTACT: D. Pearson
TELEPHONE: (705)675-4545

OPERATING TEMPERATURES:

COMMISSIONING DATE: June 1980

REPORTING PERIOD: Aug 82 to June 83

**Ministry of
Energy contact:**
J. Herberman
(416) 965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: TEMSPEC Limited
Collector Fluid - 50% Ethylene/Glycol/Water; 56 panels, collector area 114 square metres
Arrangement: 1 array with 24 panels, 1 array with 32 panels
HEAT EXCHANGER: Glycol/Water A. S. Leitch Ltd. - Four pass shell and tube - 5.6 square metre area
SOLAR STORAGE: 11,700 litres
AUXILIARY HEATERS:
SERVICE: Domestic hot water
MONITORING INSTRUMENTATION: Modified level A monitoring system measuring the following variables:

Qc - total solar energy collected
Qs - total useful solar energy delivered to load
Qa - total auxiliary energy to domestic hot water system

EXPECTED PERFORMANCE: Total Energy 700 GJ/year
Solar Fraction 0.32

**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT**

Site: Provincial Government Building
Location: Sudbury, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			11.85 (12.74)	3.86 (2.97)	-
SEP-82			14.26 (11.71)	9.43 (12.00)	-
OCT-82			12.36 (8.86)	7.55 (11.05)	-
NOV-82			4.28 (2.99)	13.91 (15.12)	-
DEC-82			3.31 (1.43)	16.26 (18.14)	-
JAN-83	0.00	0.00	2.80 (3.64)	24.80 (23.96)	-
FEB-83	0.00	0.00	3.93 (7.72)	27.60 (23.81)	-
MAR-83			0.00 (0.00)	0.00 (0.00)	Due to change in management no data was taken for March
APR-83		32.32	10.23 (14.89)	51.82 (47.16)	-
MAY-83			12.14 (16.86)	53.45 (48.73)	-
JUN-83		43.80	13.94 (17.21)	50.52 (47.25)	-
JUL-83		0.67	5.48 (16.30)	18.78 (7.96)	Reading for Qc are low possibly due to a faulty flowmeter.

Totals 76.79 94.50 278.00

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Panel fittings are damaged so the solar system is inoperative. Repair is scheduled for 15 June 1983.
- This is an Ontario Ministry of Government Services solar energy project.

Site number: 161

Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Provincial Government Building
Location: Sudbury, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	496		18.4	
SEP-82	360		13.7	
OCT-82	217		7.8	
NOV-82	120		0.4	
DEC-82	109		-8.1	
JAN-83	96		-12.3	
FEB-83	252		-10.4	
MAR-83	403		-4.5	
APR-83	510		4.0	
MAY-83	605		11.7	
JUN-83	690		17.2	
JUL-83	651		19.8	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
During Previous 12 Months:

**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 221**

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: QUEEN'S UNIVERSITY
Kingston, Ontario

CONTACT: T. Yung
TELEPHONE: (613)547-6640

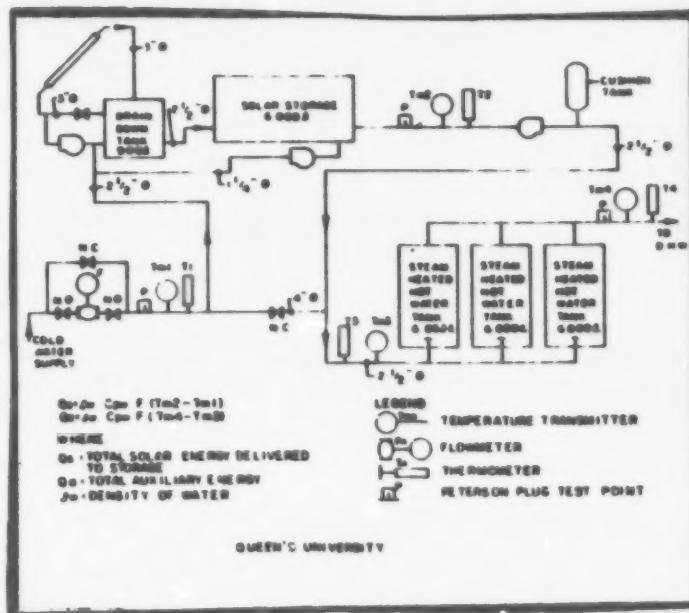
A Canada/Ontario Energy
Demonstration Project

SERVICE: Domestic hot water for gymnasium

OPERATING TEMPERATURES: 10 degrees C inlet; 60 degrees C demand

COMMISSIONING DATE: March 1983

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: NORTEC TD1000
Collector Fluid - Water
Number of Collectors - 150 Area - 293 square meters
SOLAR STORAGE: 6800 litres
AUXILIARY HEATERS: 3 - 6800 litres steam heated hot water tanks
HEAT EXCHANGERS:
MONITORING INSTRUMENTS: Flow meter - 2" Kent TM2000
Energy meter - dual channel Rho Sigma energy meter
measuring solar energy delivered and auxiliary
energy delivered

VARIABLES:

Qs - total useful solar heat delivered to the load
Qa - total useful heat delivered to the same load by auxiliary heat
source

Site number: 221

Page 2
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Queen's University
Location: Kingston

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83			16.33 (0.00)	26.05 (0.00)	-
JUN-83			34.99 (65.38)	55.82 (25.43)	-
JUL-83			40.68 (66.93)	42.98 (16.73)	Six collectors were replaced because of leakage.

Totals 92.00 124.85

Units: Gigajoules. Predicted performance is based on the "F Chart" model, using real load data, and historical average weather data.

Comments on System Performance:

- Instrumentation installed by monitoring contractor on 18 May 1983.
- One collector requires the glazing to be replaced.

Site number: 221

Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Queen's University
Location: Kingston

Weather Data for the Site (for previous 12 months)

Total Monthly Solar Radiation on a Horizontal Surface	Monthly Mean Ambient Temperature
MJ/m ²	C

Month	Historical Mean	Measured	Historical Mean	Measured
AUG-82				
SEP-82				
OCT-82				
NOV-82				
DEC-82				
JAN-83				
FEB-83				
MAR-83				
APR-83				
MAY-83				
JUN-83				
JUL-83				

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 150

REPORT DATE: 83/09/30

PAGE 1.

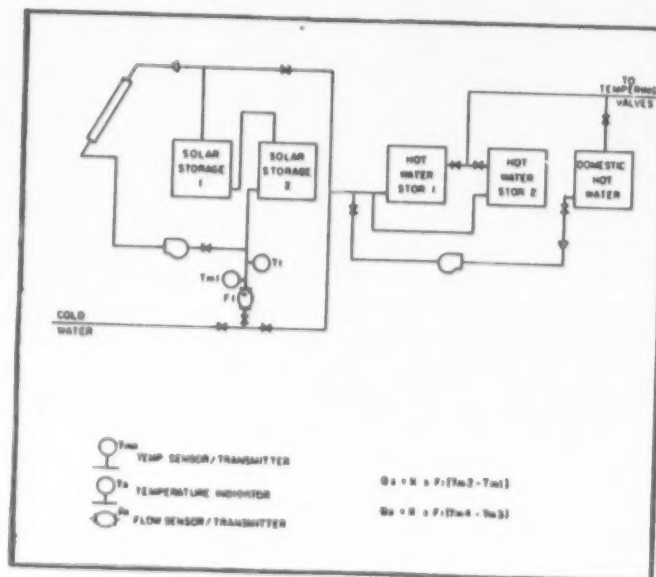
PROJECT NAME: REMI LAKE PROVINCIAL PARK
Kapuskasing, Ontario.

CONTACT: D. Jack
TELEPHONE: (705) 367-2692

COMMISSIONING DATE: May 1981

REPORTING PERIOD: Jan to June 83

Ministry of
Energy contact:
J. Herberman
(416) 965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETRO-SUN Limited
Collector Fluid - Water
Number of Panels - 8
Collector Area - 14.3 square metres

SOLAR STORAGE: 311 litres
AUXILIARY HEATERS: 360,000 BTU/hour
SERVICE: Domestic hot water

MONITORING INSTRUMENTATION: Level A monitoring provided by ORF energy meters measuring the following variables:

Qs - total useful solar energy delivered to load
Qa - total auxiliary energy

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Remi Lake Provincial Park
Location: Kapuskasing, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82			3.79 (2.66)	0.18 (1.31)	-
SEP-82			1.12 (1.15)	0.06 (0.03)	-
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83			1.47 (1.46)	0.08 (0.09)	-
JUN-83			3.38 (2.39)	0.19 (1.18)	-
JUL-83			6.31 (3.41)	0.28 (3.18)	-

Totals 16.07 0.79

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- The system performance may be impaired by backflow problems, due to the lack of a check valve.
Monitoring contractor to investigate.

Site number: 150

Page 3
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Remi Lake Provincial Park
Location: Kapuskasing, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	496		15.3	
SEP-82	360		10.0	
OCT-82	217		4.4	
NOV-82	120		-4.4	
DEC-82	109		-14.7	
JAN-83	96		-18.6	
FEB-83	252		-16.2	
MAR-83	403		-9.4	
APR-83	510		0.5	
MAY-83	605		8.3	
JUN-83	690		14.1	
JUL-83	651		16.8	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 145

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: RENAISSANCE HOTEL

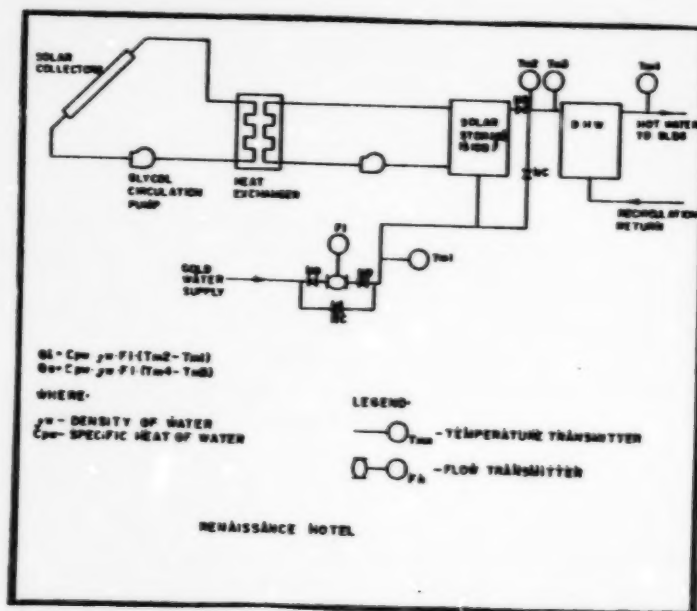
CONTACT: Murray Blakie
TELEPHONE: (416)299-1500

SERVICE: Domestic hot water

OPERATING TEMPERATURES: 5 degrees C inlet, 60 degrees C demand

COMMISSIONING DATE: Feb 1983

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLATHERM

Collector Fluid - 50% glycol/water

Number of Collectors - 120

Area - 288 square meters

SOLAR STORAGE: 15,100 litres

AUXILIARY HEATERS:

HEAT EXCHANGER: Alfa Laval P22VL

MONITORING INSTRUMENTS: Flow meter - 3" Neptune Trident cold water meter
Energy Meter - Ontario Research Foundation Dual Channel

VARIABLES:

Q_s - total useful heat delivered to the load

Q_a - total useful heat delivered to the same load by auxiliary heat source

Site number: 145

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ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Renaissance Hotel
Location: Scarborough

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83			59.20 (0.00)	241.40 (0.00)	-
JUN-83			113.50 (78.57)	383.80 (418.73)	-
JUL-83			150.19 (84.97)	439.88 (505.10)	-

Totals 322.99 1065.08

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Defective instrumentation installed by previous monitoring contractor was repaired and recalibrated by present monitoring contractor on 10 May 1983. Monitoring data are being gathered.

Report Date: JUL/83

Site number: 145

**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT**

Site: Renaissance Hotel
Location: Scarborough

Weather Data for the Site (for previous 12 months)

Total Monthly Solar Radiation on a Horizontal Surface MJ/m²	Monthly Mean Ambient Temperature C
---	---

Month	Historical Mean	Measured	Historical Mean	Measured
AUG-82	589		21.2	
SEP-82	420		17.1	
OCT-82	279		11.0	
NOV-82	150		4.9	
DEC-82	130		-1.6	
JAN-83	96		-4.6	
FEB-83	252		-3.9	
MAR-83	403		0.7	
APR-83	510		7.6	
MAY-83	620		13.6	
JUN-83	660		19.1	
JUL-83	682		22.0	

Training and Recent Activity of Site Personnel:

**Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:**

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 152

REPORT DATE: 83/09/30

PAGE 1

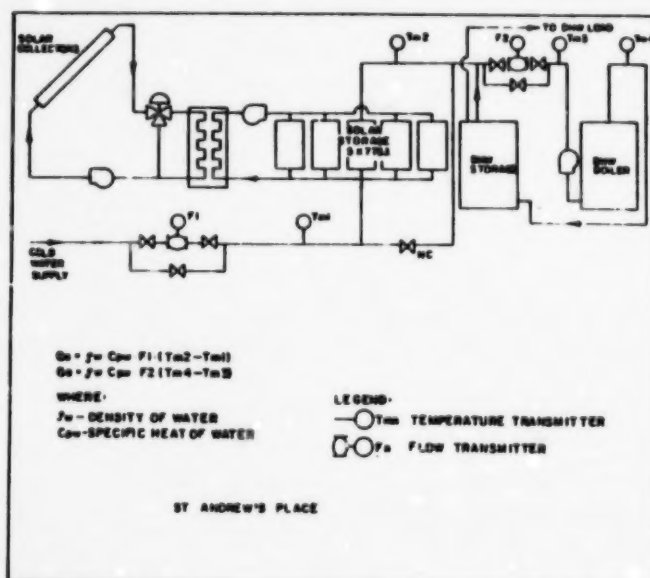
PROJECT NAME: ST. ANDREW'S PLACE

CONTACT: Joe Bichoff
TELEPHONE: (705)674-0721

SERVICE: Domestic Hot Water Heating
OPERATING TEMPERATURES: 14 Degrees C Inlet; 65 Degrees C Demand

COMMISSIONING DATE: September, 1982 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: PETROSUN
Collector Fluid - 50% Propylene Glycol/50% Water
Number of Collectors - 25 Area - 150 square meters
SOLAR STORAGE: 3875 litres
AUXILIARY HEATERS: Gas fired boiler
HEAT EXCHANGERS: Alpha Laval, P22 VL

MONITORING INSTRUMENTS: Energy Meters - 2 ORF Single Channel energy meter
Flow Meters - 3" Trident warm water flow meter
- 3" Trident cold water flow meter

VARIABLES:

Q_s - total useful solar heat delivered to the load
 Q_a - total useful heat delivered to the same load by auxiliary heat source

Site number: 152

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: St. Andrews Place
Location: Sudbury

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83					
JUL-83			23.80 (29.50)	17.28 (11.58)	Qa calculated using a suitable temperature differential and the flow data.
Totals			23.80	17.28	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- A new pulsehead has been ordered to replace the defective flowmeter installed by the previous monitoring contractor.

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: Ontario Correctional Institute
Location: Brampton, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		18.9	
SEP-82	420		14.8	
OCT-82	279		8.8	
NOV-82	150		2.8	
DEC-82	130		-4.1	
JAN-83	96		-7.3	
FEB-83	252		-6.6	
MAR-83	403		-1.5	
APR-83	510		5.8	
MAY-83	620		11.6	
JUN-83	660		16.9	
JUL-83	682		19.8	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:



ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 154

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: ST. JAMES THE APOSTLE CHURCH
Sharon, Ontario.

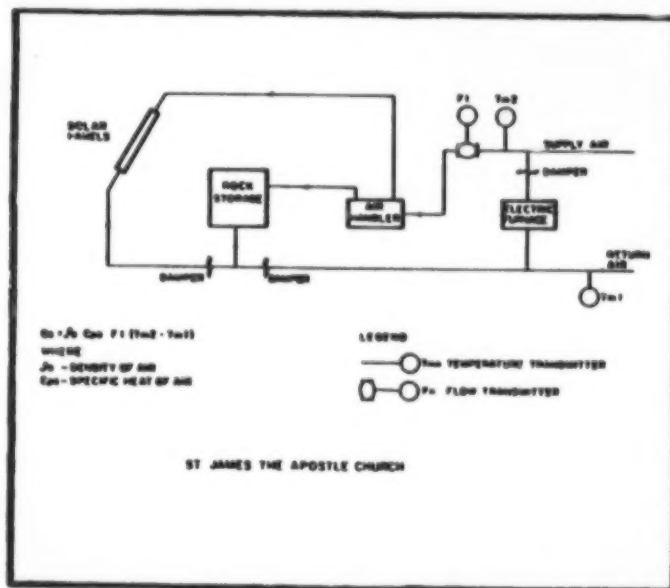
CONTACT: Rev. A. Jungers.
TELEPHONE: (416)478-4077

SERVICE: Space Heating.

OPERATING TEMPERATURES:

COMMISSIONING DATE: October 1982 REPORTING PERIOD: Aug 82 to July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTECH

Collector Fluid - Air

Number of Collectors - 68

Area - 80 square meters

SOLAR STORAGE: Concrete Rock Bin - volume 86 cubic meters

AUXILIARY HEATERS: Electric furnace

Capacity: 25 KW

MONITORING INSTRUMENTS: Ontario Research Foundation Single Channel Temperature

Sensors- 2 Air Energy Meter sets (5 sensors/set) -Enercon flow transducer

VARIABLES:

Qs - total useful solar heat delivered to the load

Site number: 154

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: St. James the Apostle Church
Location: Sharon, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82			0.20		-
DEC-82			0.20		-
JAN-83	0.00	0.00	1.41		-
FEB-83			1.16		-
MAR-83			1.16		-
APR-83			1.06		-
MAY-83			1.29		-
JUN-83			1.37		System to be shut down for the remainder of the summer.
JUL-83			0.00		-
Totals			7.85		
Units: Gigajoules.					

Comments on System Performance:

- Auxiliary energy has not been measured.
- This system suffers from air leaks and an insufficient control strategy.

Site number: 154

Page 1
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: St. James the Apostle Church
Location: Sharon, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature °C	
	Historical Mean	Measured	Historical Mean	Measured
AUG-82	589		18.1	
SEP-82	420		14.1	
OCT-82	279		8.5	
NOV-82	150		2.1	
DEC-82	130		-5.4	
JAN-83	96		-8.9	
FEB-83	252		-8.2	
MAR-83	403		-3.0	
APR-83	510		4.8	
MAY-83	620		11.3	
JUN-83	660		16.5	
JUL-83	682		19.1	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 155

REPORT DATE: 83/09/30

PAGE 1

PROJECT NAME: SANSFIELD SENIOR CITIZEN
HOUSING PROJECT,
Sarsfield, Ontario

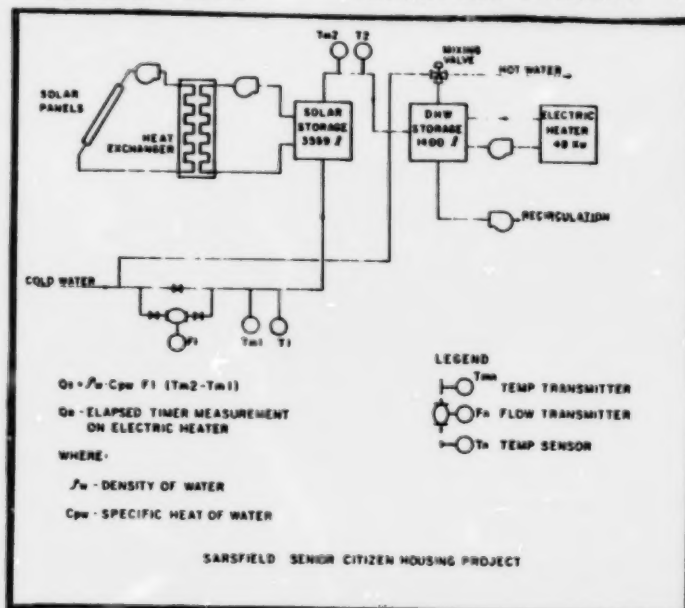
CONTACT: E. Cadieux
TELEPHONE: (613)835-2254

SERVICE: Domestic Water Heat

OPERATING TEMPERATURES: 10 degrees C inlet; 60 degrees C demand

COMMISSIONING DATE: October 1982

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: NORTEC TD1000

Collector Fluid - 50% propylene glycol/water

Number of Collectors - 24

Area - 47 square meters

SOLAR STORAGE: 3560 litres

AUXILIARY HEATERS: 48 KW electric immersion heater with 1400 litres hot water storage tank

HEAT EXCHANGER:

MONITORING INSTRUMENTS: Flow meter - 1 1/2" Kent C700 - FE
Energy meter - Single channel Rho Sigma energy meter measuring solar energy delivered
Elapsed timer - to measure on-time of electric heater

VARIABLES:

Q_s - total useful solar heat delivered to the load

Q_a - total useful heat delivered to the same load by auxiliary heat source

Site number: 155

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Sarsfield Housing Project
Location: Sarsfield

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			0.43 (7.65)	17.41 (10.19)	-
JUL-83			0.63 (8.19)	17.69 (10.13)	-
Totals			1.06	35.10	

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Instrumentation installed by the monitoring contractor on 31 May 1983.
- There is no solar bypass which makes the repairs and servicing of the system inconvenient.
- The system performance may be impaired by backflow problems, due to the lack of a check valve.

Site number: 155

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Report Date: JUL/8

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Sarsfield Housing Project
Location: Sarsfield

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		19.4	
SEP-82	420		14.6	
OCT-82	279		8.5	
NOV-82	150		1.6	
DEC-82	130		-7.5	
JAN-83	96		-10.8	
FEB-83	252		-9.5	
MAR-83	403		-2.9	
APR-83	510		5.7	
MAY-83	620		12.8	
JUN-83	660		18.1	
JUL-83	682		20.6	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
During Previous 12 Months:

**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 158**

REPORT DATE: 83/09/30

PAGE 1

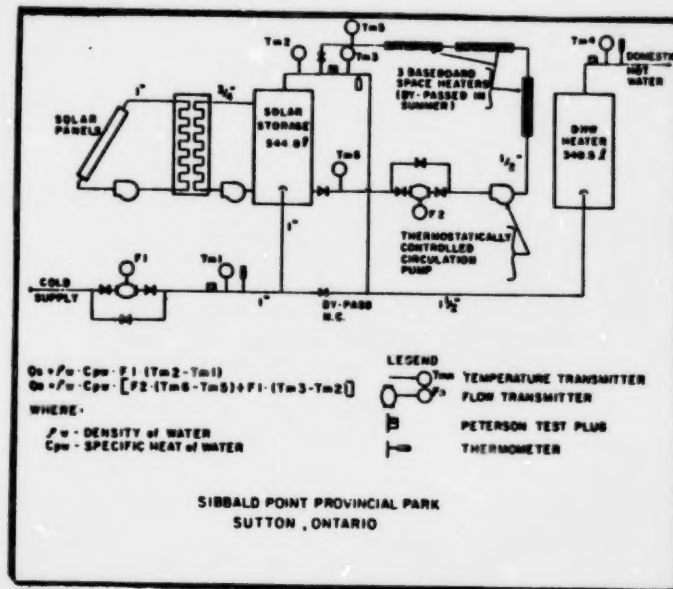
PROJECT NAME: SIBBALD POINT PROVINCIAL PARK

CONTACT: Mike Charbonneau
TELEPHONE: 722-3268

SERVICE: Domestic Hot Water Heating and Space Heating
OPERATING TEMPERATURES: 7.5 Degrees C Inlet; 60 Degrees C Demand

COMMISSIONING DATE: November, 1983

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: ENERSOURCE
Collector Fluid - 50% Glycol, 50% Water
Number of Collectors - 10 Area - 23 square meters

SOLAR STORAGE: 544.8 litres

AUXILIARY HEATERS: Gas fired, 340.5 litres, DHW heater

HEAT EXCHANGERS: Noranda HX886 350 LDA

MONITORING INSTRUMENTS:

- Rho Sigma Dual Energy meter
- Rho Sigma Channel Energy meter
- Kent 1 inch cold water flow meter
- Kent 1/2 inch warm water flow meter

VARIABLES:

Q_s - total useful solar heat delivered to the load
 Q_a - total useful heat delivered to the same load by auxiliary heat source

Site number: 158

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Sibbald Point Prov. Park
Location: Sutton, Ont.

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			0.40 (3.48)	6.98 (3.90)	Monitoring equipment commissioned June 16, 1983.
JUL-83			0.89 (4.16)	15.47 (12.20)	-

Totals 1.29 22.45
Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Site contact reported the system required
27 litres of glycol.

Site number: 158

Page 3
Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: Sibbald Point Prov. Park
Location: Sutton, Ont.

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		18.1	
SEP-82	420		14.1	
OCT-82	279		8.5	
NOV-82	150		2.1	
DEC-82	130		-5.4	
JAN-83	96		-8.9	
FEB-83	252		-8.2	
MAR-83	403		-3.0	
APR-83	510		4.8	
MAY-83	620		11.3	
JUN-83	660		16.5	
JUL-83	682		19.1	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

**ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 225**

REPORT DATE 83/09/30

PAGE 1

PROJECT NAME YORK CONDOMINIUMS

CONTACT: Joe Schnezler
TELEPHONE: (416)662-1570

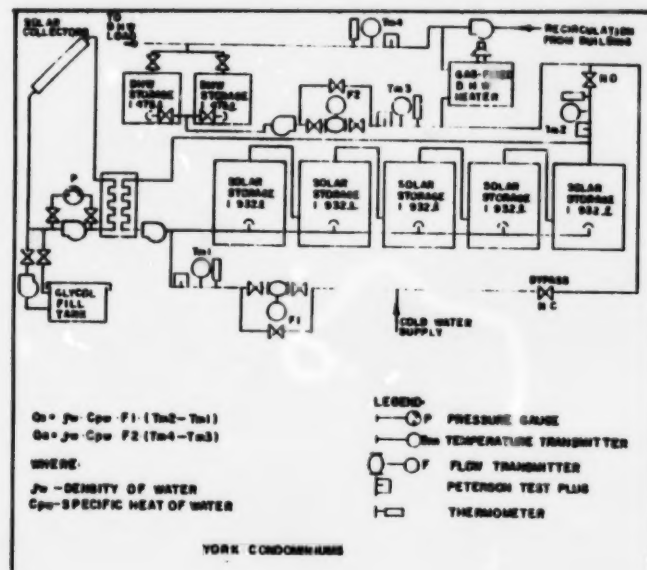
SERVICE

OPERATING TEMPERATURES: 10 Degrees C Inlet; 60 Degrees C Demand

COMMISSIONING DATE: July 1 1983

REPORTING PERIOD: Aug 82 - July 83

Ministry of
Energy contact:
J. Herberman
(416)965-0367



SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: SOLARTHERM
 Collector Fluid - 50% propylene glycol/50% water
 Number of Collectors - 104 Area - 310 square meters
SOLAR STORAGE: 9 600 litres
AUXILIARY HEATERS two gas fired DHW heaters 750 000 BTU/hr
HEAT EXCHANGERS: Alfa Laval P22HBL

MONITORING INSTRUMENTS: Flow meters - Kent TM200 - 2"
 - Kent TM230 - 2"
 Energy Meter - Rho Sigma RS 815 FP dual energy meter

VARIABLES:

Qs - total useful solar heat delivered to the load
 Qa - total useful heat delivered to the same load by auxiliary heat source

Site number: 225

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: York Condominiums
Location: Islington

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83					
JUL-83			109.65 (80.39)	0.28 (28.54)	Auxiliary reading invalid due to electronic circuit board failure in energy meter.

Totals 109.65 0.28
Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

Site number: 225

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: York Condominiums
Location: Islington

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		21.2	
SEP-82	420		17.0	
OCT-82	279		11.0	
NOV-82	150		4.9	
DEC-82	130		-1.6	
JAN-83	96		-4.6	
FEB-83	252		-3.9	
MAR-83	403		0.7	
APR-83	510		7.6	
MAY-83	620		13.6	
JUN-83	660		19.1	
JUL-83	682		22.0	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT
SITE NUMBER 224

REPORT DATE: 83/09/31

PAGE 1

PROJECT NAME: YORK ELECTROPLATING
Thorold, Ontario

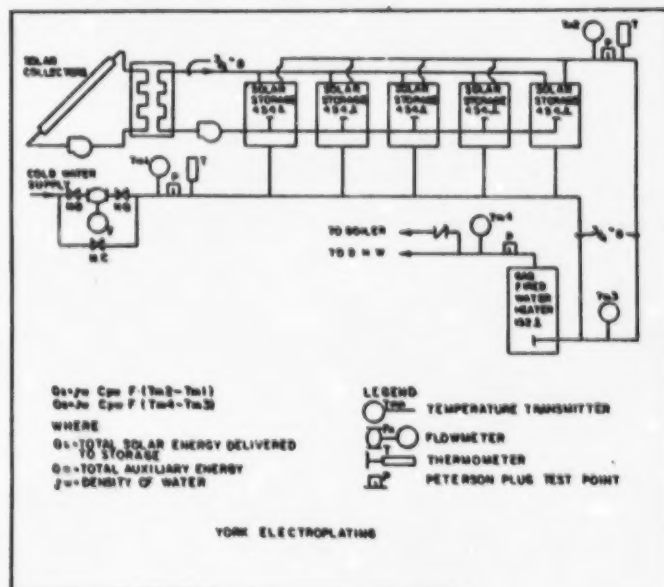
CONTACT: Bryant Irvine
TELEPHONE: (416)227-2260

A Canada/Ontario Energy
Demonstration Project

SERVICE: Preheat for domestic
OPERATING TEMPERATURES: 10 degrees C inlet; 65 degrees C demand

COMMISSIONING DATE: Dec 82

REPORTING PERIOD: Aug 82 to July 83



Ministry of
Energy contact:
J. Herberman
(416)965-0367

SYSTEM DESCRIPTION:

SOLAR COLLECTORS: Manufacturer: ENERSOURCE
Collector Fluid - 50% propylene glycol, 50% water
Number of Collectors - 28 Area - 58.83 square meters

SOLAR STORAGE: 2728 litres

AUXILIARY HEATERS: Oil DHW heater, 181.6 litres

HEAT EXCHANGERS: Noranda, HX 886 350 LODA

MONITORING INSTRUMENTS: Flow meter - Kent 3/4", C-700
Energy meter - Rho Sigma Dual, (RS815) channel for
solar energy delivered; channel for auxiliary energy
from gas fired heater

VARIABLES:

Qs - total useful solar heat delivered to the load
Qa - total useful heat delivered to the same load by auxiliary heat
source

Report Date: JUL/83

Site number: 224

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORTSite: York Electroplating
Location: Thorold, Ontario

Measured/(Predicted) Performance

Month	Q(i)	Q(c)	Q(s)	Q(a)	Remarks
AUG-82					
SEP-82					
OCT-82					
NOV-82					
DEC-82					
JAN-83					
FEB-83					
MAR-83					
APR-83					
MAY-83					
JUN-83			4.70 (4.94)	0.43 (0.19)	-
JUL-83			4.84 (5.24)	0.44 (0.04)	-

Totals 9.54 0.87

Units: Gigajoules. Predicted performance is based on the "F Chart" model,
using real load data, and historical average weather data.

Comments on System Performance:

- Instrumentation installed by monitoring contractor
on 13 May, 1983.

Site number: 224

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Report Date: JUL/83

ONTARIO MINISTRY OF ENERGY
MONTHLY SOLAR MONITORING REPORT

Site: York Electroplating
Location: Thorold, Ontario

Weather Data for the Site (for previous 12 months)

Month	Total Monthly Solar Radiation on a Horizontal Surface MJ/m ²		Monthly Mean Ambient Temperature C	
	Historical	Measured	Historical	Measured
	Mean		Mean	
AUG-82	589		21.0	
SEP-82	420		17.0	
OCT-82	279		10.9	
NOV-82	150		4.7	
DEC-82	130		-1.0	
JAN-83	96		-4.3	
FEB-83	252		-3.7	
MAR-83	403		0.7	
APR-83	510		7.2	
MAY-83	620		13.0	
JUN-83	660		19.0	
JUL-83	682		21.7	

Training and Recent Activity of Site Personnel:

Solar Heating System Maintenance and Repair Costs
during Previous 12 Months:

POOR

QUALITY

ORIGINAL